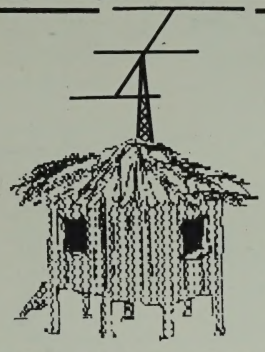
Digital Digest

Vol. 3 No. 2 | *Devoted entirely to Digital Amateur Radio Communications* | March/April 1990

In This Issue:



From The Publisher's Shack

With growing interest in the digital modes there continues to be a proliferation of new software and hardware coming on the amateur radio scene. Pick up any of the amateur radio magazines and you'll see a growing number of ads for computer based accessories. Go to any "Hamvention" and virtually half (or better) of the exhibitors represent computer or software firms.

It is this growing interfacing of computers with amateur radio where we at Digital Digest hope to shine. Here is where we hope to bring you more in-depth articles on the essentials to obtaining the most enjoyment from your digital ham/computer interests. This is why, with this issue, we are happy to introduce yet another column to the publication. The Amiga Corner, by Ben Williams (AA7AS) will have obvious interest to hams with Amiga's and may also tantalize those without an Amiga to take a second look at this most versatile of computers.

When I asked Ben for a paragraph or two "bio" to use here as a means of introduction, I probably should have known better. And I can't say that Ben didn't try to warn me. What I received from Ben was something closer to article length. Rather than do Ben an injustice by trying to shorten the length and breadth of his knowledge and accomplishments into a paragraph, we've added a sidebar to his column instead. Now, you'll read in unedited form, why, if you have, or think you might like to have an Amiga, Ben's the guy to know. We welcome Ben most enthusiastically to our staff.

On another staff member, we all at Digital Digest extend our prayers and warmest wishes to Norman Sternberg, W2JUP for a rapid recovery. For those readers not aware, between our last issue and this, Norman underwent a pretty rigorous heart operation and is now at home recuperating. It was through much of Norman's encouragement and support that brought Digital Digest into being during the early going of the publication. We look forward to much more of Norman's wit and wisdom in future issue's so please, get well soon dear friend!

Well that's about it from me for this issue. Thanks again to all who are contributing in various fashion to helping make Digital Digest an ever better publication. Keep up the good work and don't forget to keep those cards, letters, articles, ads and subscriptions coming.

Hope to see you on the low end of the bands... 73's, Tom / WA8DXD

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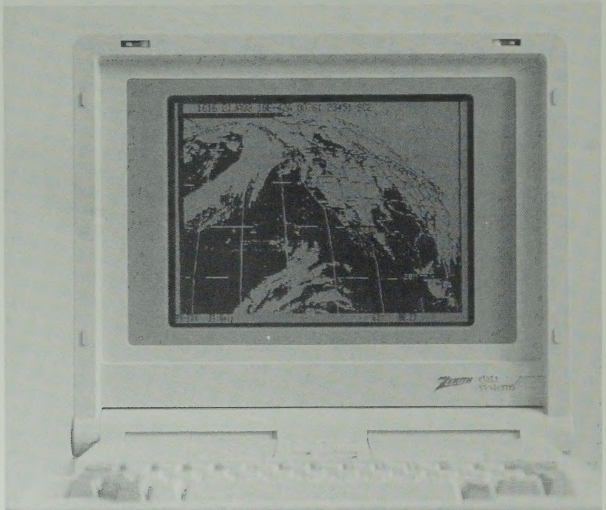

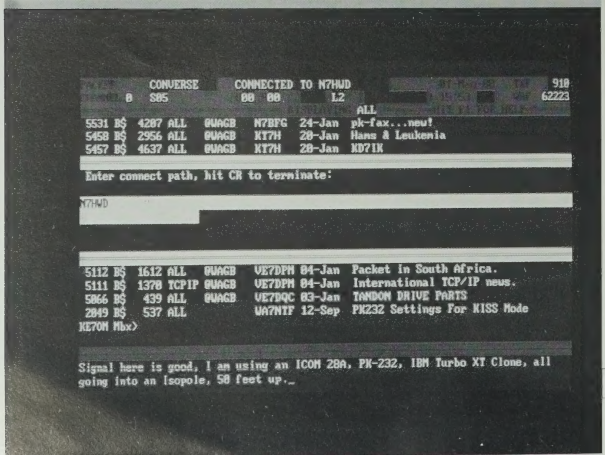

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"Radio School" of the Air...

Gordon West, WB6NOA, is offering southern California hams a new way to upgrade to General Class. The nationally recognized amateur radio educator is teaching a free, on-the-air code and theory class that meets each Tuesday evening on 28.333 MHz. This frequency was chosen since it is available to holders of all license classes, including Novice operators, and permits WB6NOA to not only voice the theory part of the course, but also to provide code practice on the channel.

Another unique feature of the course is the ability for West to be heard throughout southern California even in times of marginal propagation. Using the facilities of DAve Corsiglia's (WA6TWF's) "super remote base," he is able to field questions from all over the area. The class meets at 7:00 p.m. PST, and each week the code practice portion increases 1 w.p.m. at the now-standard 15 w.p.m. character rate but with big spaces between letters to slow it down for beginning sessions.

At the end of the eight week session there will be a VE-administered test that listeners can attend. For further information on this free service, write Gordon West, WB6NOA, Radio School, 2414 College Drive, Costa Mesa, CA 92626, or call (714) 549-5000.

Amateur Radio - A Safer Hobby...

The government's first conviction of a computer hacker under a 1986 computer tampering law occurred on January 24 when a jury found Robert T. Morris guilty under the act.

Morris, a suspended Cornell University graduate student from Arnold, Maryland, was convicted of intentionally breaking into a federal computer network and setting free a "worm" program that paralyzed the 6,000 computers on the system.

He was the first person brought to trial under the section of the 1986 Computer Fraud and Abuse Act that makes it a felony to intentionally access a "federal interest computer" without authorization, and alter, destroy or damage information or prevent authorized use of a computer if such conduct causes the loss of $1,000 or more during any one year period.

The law applies only to US government computers, computers of financial institutions and computers on networks in more than one state.

Source: WestLink Report - 03/02/90

Shortwave Listeners...

Tune in Sunday mornings at 10 a.m. Eastern time on 7240KHz for the ANARC SWL Ham Net. Bob Brown, KW3F, is the SWL Net Moderator. By the way, if you are interested in listening to some short wave broadcast antics, try tuning between 7410 and 7420 - which is not in the ham bands. It is where all the clandestine broadcast pirates seem to congregate.

Source: W5YI Report

FCC to HAMS: Know Your VFO!...

The FCC has issued over 240 notices of violation to amateur stations in connection with the Bouvet Island DXpedition that began operating on Dec. 28. The operation was marked by massive pileups and QRM. Bouvet, in the South Atlantic, is governed by Norway. The DXpedition signed 3Y5X.

Hams were cited for the violations between Jan. 2 and Jan. 13, 1990. The citations went out for transmitting phone emissions, a violation of §97.305(c) which partitions the HF bands into segments for different uses.

The FCC said that this partitioning "...facilitates amateur service stations using inharmonious emissions within a given band. Voice and data emissions are inharmonious because voice emissions tend to dominate the spectrum when the two emissions share spectrum. The unauthorized use of the amateur service band in this manner disturbs the carefully arranged balance between frequencies for analog and digital emissions."

Bouvet worked "split" - transmitting phone legally, under their rules on 14.145 MHz for example, and listening higher in the band - but many U.S. hams apparently failed to set their VFO's properly and ended up calling Bouvet on its transmit frequency out of the U.S. phone band.

"Although these violations appear to have resulted from misuse of increasingly complex amateur service equipment rather than any willful action," the FCC said, "amateur service licensees are reminded that the station license is responsible for the proper operation of the station and will be held responsible for the transmission of an unauthorized emission under §Section 97.103 of the Commission's Rules."

The notice of violation does not carry a monetary fine. A $200 Notice of Apparent Liability for forfeiture would come when the station is cited a second time for the same violation.

Although 240 stations may sound like a major enforcement action, it is but a small number of the well over 40,000 contacts that the Bouvet operation made in its 2-1/2 week period.

"The goal of the game was to get into Bouvet's logbook, which you can't do if you are transmitting on their transmit frequency," one FCC staffer observed. "But in the heat of battle, sometimes circuits in the brain don't connect."

Source: W5YI Report

by Lynn W. Taylor, WB6UUT
463 Myrtle Street • Laguna Beach, CA 92651

TNC Parameters and Packet Performance

In the original TAPR Beta TNC manual, the section on commands begins with the comment that most parameters will never be changed by anyone whose elevator goes all the way to the top. While this is basically true, some of the current default parameters, which worked fine in the earlier days of Packet, should be reviewed. I should probably state that some of the comments I'm about to make are a little controversial, but are based on my experience in Southern California in both keyboard to keyboard QSOs and large file transfers, by steady observation of the network (what works and what doesn't), and by reading most everything I can find on the subject.

Tools:

An invaluable tool for this kind of expertise is Packet-PLUS. This program, available for use with AEA Packet controllers and IBM compatible computers. Packet-PLUS allows the user to simultaneously monitor network activity and operate. It also displays the link state, number of frames pending, and the number of retries. It is obvious when your throughput slows down, and by looking at the monitor screen, it becomes obvious what makes the network slow down.

I'll also be talking about a simple software "model" of a packet network which you can run on your IBM compatible computer. I'll be using the AEA command names simply because I use AEA controllers. Some parameters may have different names on your TNC. I want to make one thing very clear: I am talking about optimizing the whole network. Many people try to optimize their throughput at the expense of others. While this works for the first guy or two who operates with aggressive parameters, once others begin to figure out how that guy gets so many packets through, they crank things up, collisions increase radically, and everybody slows way down. Besides, this is a hobby, relax!

FRACK:

Several years ago, I used to watch two stations, one near Los Angeles and one near San Francisco, using the digipeater chain up and down the coast. The path was about four hops long, and both ran low values for FRACK and had tremendous difficulties. What was happening was simple. Due to low FRACK values, the sender almost always timed out and sent a retry before the RR frame got back. The southbound RR frame collided with the northbound data frame, destroying both and the retries started again. This happens even on one-hop paths when digipeating, or direct to your local node. If everyone has the same value for FRACK, everyone is going to retry at about the same time.

Solution: run a different value of FRACK! I routinely run FRACK 7 here, and I avoid multiples of 3, so 5, 7 and 11 are my usual recommendations. Enough folks run 7 here now that I'll probably change soon. Also, when digipeating, if you get lots of retries, ask the other guy what FRACK value he's using, and set yours differently.

FRACK and NET/ROM:

I've noticed this with several local Bulletin Boards, and when doing file transfers through NET/ROM nodes, and it should exist with any of the layer 3 networks. It is very easy to push data in to a node faster than it can push it out, especially if the recipient is on the same channel. When the node gets full, it sends RNR frames to 'hold off' additional data. The user then polls when FRACK runs out to see if the node can take more data, but these polls use time that the node could have used to free up space. Raise FRACK (and lower PER if using p-Persistence, see below) so your node has a chance to move out frames. Ideally, you should be just above the highest value which generates RNR frames.

DWAIT:

There is a common misconception about DWAIT. Several documents show proper values for different kinds of stations and activities. Bulletin Boards should have higher values than Keyboard to Keyboard users to give priority to the low traffic stations (get 'em out of the way), and File Transfers should have the highest values. Since DWAIT means Digipeater Wait, some references suggest setting DWAIT to 0 if your station is used for digipeating. Since the TNC firmware recognizes repeated frames, it automatically 'suspends' DWAIT for these frames, so setting DWAIT to 0 essentially assigns all of your frames the highest priority, not just those you repeat for others. Set your DWAIT parameter to match your operation and ignore digipeating. The TNC firmware will take care of anyone who digipeats through.

TXDELAY:

Assuming 150 characters per second, and something like 80 characters per line, the data part of a packet takes something like 0.6 seconds. With the default TXDELAY, it takes 0.3 seconds to key the radio ' in other words, one third of the total time is just keying and synchronization. Or, to put it another way, if we could run an "instantaneous" baud rate, but had to keep the current TXDELAY, we could only go three times faster. WA4EGT and I do a lot of file transfers. We have found that he needs a TXDELAY of 10 for me, and I need to set mine to about 12. There are two factors here, key up delay on one end, and the squelch response and carrier detect on the other end. Lowering TXDELAY too far will prevent some stations from connecting to you. Try and find the lowest value for the "worst" station in your area and use that. Lower values will begin eliminating other stations who may want to connect to you. Use the "optimum" TXDELAY when transferring files or for other "high volume" applications.

PACLEN and line lengths:

Some are going to disagree here: I advocate short packets! It is simple. If the channel is good, run as long a packet as you can. But, when the channel is busy, when there are hidden terminals, etc., small packets are a smaller target, and will get through when big packets will retry. Also, consider your reader. It is harder to read text when a word is broken between lines, so try to hit the return key before you reach column 80. If both stations set FLOW ON, and hit return on every screen line, each line will contain your text exclusively, or the other guy's text exclusively. Intelligent programs often have elaborate mechanisms to prevent this problem.

Note: PACLEN does not add carriage returns! PACLEN does not control the length of a line, just how many characters get sent in a packet. One packet does not necessarily equal one line. Short packets (and higher values for FRACK) are essential for HF operation. p-Persistence:

p-Persistence refers to the probability of a station with traffic actually trying to send its data across the network. If your TNC is set to the defaults (or is not capable of p-Persistent operation), then the value of 'p' in your unit is one, which means it will try to transmit every time the channel is clear. A 0.5-Persistent TNC will transmit exactly half the time. Two stations running in this fashion will either: a) both transmit, b) the first will transmit, the second will not,

c) the second transmits while the first is silent, or d) not transmit at all. Note that in two out of three cases where a station transmits, there is no collision.

To demonstrate exactly how this works, I built a model. My model network is a program written in Pascal. Each station checks the 'ether' to see if a station is transmitting, and if so, waits. If the ether is clear, then each station decides independently whether it has traffic, and if so, whether it should transmit. After all stations have made their decisions, the state of the ether is updated. The model takes into account the decision time (interval between when the TNC realizes the channel is clear until it keys the transmitter and another station can tell the channel is busy), differing packet lengths, and channel loading from 10% to 200% of the theoretical 'maximum' throughput. It ignores the effect of the FRACK timer, DWAIT, signal propagation and DCD performance.

I ran the model several times to measure the overall network performance under different conditions. With ten 1-persistent stations, maximum throughput (58% of the theoretical maximum rate) occurred at 40% of the maximum theoretical load, and dropped quickly. At 200%, collisions occurred 76% of the time. With the same number of 0.1-persistent stations, the peak utilization is 59.5%, stays over 58% up to the theoretical maximum loading (100%), and is still above 50% at 200% loading. At 200%, collisions occur only 34% of the time. As you add stations,the model still peaks at around 40% of load, but this level of channel loading represents much less data from each station, i.e. for a given level of loading, a station may send four times as much data when ten stations are on than when there are forty.

The important part, however, is what happens as the channel gets busier. With 1-persistent stations, the channel degrades rapidly, while a channel operating with reasonable persistence levels continues operating much nearer to capacity. When half of the stations in a network are 1-persistent and half are 0.1-persistent, the model shows that the 0.1-persistent fare at least as well as the 1-persistent stations, and the total throughput increases. My experience suggests that p-Persistent operation may actually be faster. Mixed 1-persistent and p-persistent networks do work! The p-persistent stations may even enjoy a slight advantage over the 1-persistent stations. In actual packet networks, I've found that 255 divided by the number of active stations seems to work pretty well. Under normal conditions, I have PER set to 48 (assuming about 6 stations active). SLOTTIME should be a bit more than TXDELAY, 50 seems fine.

If you are interested in running the model yourself, just send a formatted floppy disk in a stamped, self-addressed disk mailer to the address at the top of this column, or look for MODEL.EXE in HAMNET library 9 on CompuServe. I'll include both source (which can be compiled with Turbo Pascal 4.0 through 5.5) plus an executable file you can run without having to own a Pascal compiler.

Ragchewing without guilt:

On our local 2 meter repeater, we have had to remind users about ragchewing, especially during busy times (like commuting hours). On Packet, especially if you set your parameters appropriately, ragchewing is barely noticable. Get on! Watch for CQs, folks you've never talked to, interesting QSOs, whatever interests you and join in!

Packet affects your enjoyment of our favorite hobby in other ways: I bought a new Compact Disk player for the "shack" a few months ago, and you can't listen to music and operate CW or SSB! Packet Radio is compatible with Jazz, Rock, Classical, Pop, you name it!

If you have any comments or would like to see any special topics discussed in this column, let me know. Feel free to drop me a note, or leave me a message on CompuServe (74176,52). I'd like to hear from you.

MFJ Enterprises...

announces another new product for the radio amateur. The MFJ-1112 Multiple DC Power Outlet gives you six pairs of heavy duty binding posts for connecting your accessories.

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If you have news and information of interest to the digital amateur radio community please be sure to let us know!

by Norman Sternberg, W2JUP
279 Adirondack Drive • Farmingville, NY 11738

Sitor Versus Packet Radio - Which Is Best?

Debate has arisen during the last several years regarding the differences be-tween SITOR and packet radio as "competing" forms of digital communications. There is really only one important characteristic common to both of these RTTY modes: both SITOR and packet radio have built-in systems of error detection and error correction. Beyond that, these modes are very different; each mode is best suited to the specific applications for which it was designed. SITOR and packet radio are NOT competing for your attention!

HANDLING MESSAGE TRAFFIC? CHOOSE SITOR!

SITOR is is designed to get a text message (such as conventional "radiogram" traffic) through in the poor propagation and interference conditions common to HF operation.

Based on its origins in telex, SITOR is limited by regulation to a signalling speed of 100 bauds, resulting in a throughput speed of 50 bauds or 66 WPM. At the present time, no higher-speed SITOR protocols exist, although experimental work is being done with SITOR at higher speeds.

The Netherlands Post and Telegraph Administration and the Dutch electronics firm Philips, developed SITOR specifically to bring high-seas vessels into the existing international telex network via HF radio. The CCITT international standards of performance for the world's telex networks specify that the error rates in the telex network may not exceed three character errors in 100,000 characters.

The seven-bit SITOR code was derived from the 5-bit Baudot-Murray code (known as CCITT International Telegraph Alphabet Number 2) and is easily translated to and from that code. The use of ITA #2 is mandatory in the world-wide telex network, although the code contains only 32 character combinations. Two of these characters are used as control characters, shifting between letters and figures to allow upper-case letters, numerals, and limited typewriter-style punctuation.

The two additional bits in the SITOR code theoretically permit 128 character combinations. However, in the SITOR system, this is reduced to 35 combina-tions, (admitting the same characters used in the Baudot-Murray code), as a result of the elimination of all possible combinations except those character data strings that can follow a constant-pattern mark-to-space ratio of four marks to three spaces (4/3). The strict use of this 4/3 mark/space ratio pro-vides significant error detection and error correction when messages are sent in blocks of three characters.

SITOR does not use any form of parity, CRC or checksum to detect errors. Thus there is not much overhead ("excess baggage" - complex control characters) in information being transmitted. There is some statistical evidence showing that invalid characters may be falsely validated approximately once in every 20,000 characters - an acceptably low probability.

In ARQ, when the Information Receiving Station (IRS) receives a block with three valid characters, it sends a control signal back to the Information Sending Station (ISS). The returned control character commands the ISS either to send the next block of new text, or to repeat the previous block of three characters. During worst-case path conditions, the link between the two sta-tions may fail entirely.

The system will stop when only invalid data is being passed, or when requests for repetition are continuous. When this occurs, the SITOR protocols require that the station which initiated the communications link (the "master") auto-matically revert to a resynchronization routine until the path is once again adequate for passing error-free messages.

Thus, under extremely poor conditions on HF, the traffic will be moved, even between the dots and dashes of interfering CW signals. The link throughput rate (the amount of valid information actually transferred) will slow down, perhaps drastically (maybe only five WPM!) But, in many cases, slow error-free throughput is better than no transfer of data at all. Any minimum path will allow traffic to be moved!

SITOR, as accurate as it may be, cannot be used normally to transfer computer program or binary files. The SITOR code set does not include many of the characters required for program listings. For example, source code in BASIC, Pascal and C languages require characters like the "greater than" and "lesser than" (> <) signs, "asterisks" (*), "equals" signs (=), left and right "square brackets" ([ ]), left and right "curly brackets" ({ }) and other characters contained in the ASCII and EBCDIC code sets, but absent from the Baudot-Murray and SITOR codes.

DATA TRANSFER OR HEAVY MESSAGE TRAFFIC UNDER GOOD PROPAGATION CONDITIONS -PACKET RADIO IS THE BEST CHOICE!

Packet radio, unlike SITOR, can move any type of information in any character code in a network environment. The packet protocol is transparent to the code and speed used by the sending station.

The packet equipment (TNC, PAD, hardware and software) converts the sending station's data into the form the network requires, and at the distant end, reconverts the data back to the form required by the receiving station. Your terminal can literally operate in Baudot-Murray, ASCII, EBCDIC - the network doesn't care. Packet radio is the ideal means of transferring computer program and binary files, with or without modem file transfer protocols.

Error detection in packet protocols uses a special mathematical expression, which, in effect, calculates a numerical value representing each transmitted data character; the values of all the characters in the sync (flag) field, the control and address fields, and the entire information field (the data or in-formation typed by the user). The derived value is placed in the frame check sequence field and the packet is transmitted to the network.

The receiving station's system performs the same polynomial calculation of the received packet frame containing the same flag, control, address, and user data fields, derives the frame-check value, and then compares the values of the received data to the value contained in the received frame check sequence field. If these values agree, the receiving station sends an "acknowledge" packet backwards on the network and the sending station continues with the next packet.

If the frame-check sequence value calculated by the receiving station does not agree with the value in the received frame-check sequence, the receiving sta-tion throws the packet away and sits there listening. The transmitting sta-tion counts the time since the transmission of the last packet, and after the system decides that enough time has elapsed and it has not received the "ACK" packet, the sending station retransmits the same packet again and once more waits for the "ACK". This automatic "retry" operation will continue for up to a predetermined number of retries, after which the sending system decides that the link is

failed, issues a "disconnect" command to the distant end, shuts down and waits for a new operator command.

Packet systems are designed to operate over a standard voice-grade circuit, that is, a circuit equivalent to a voice-quality telephone line. This is the quality of signal generally available on a reasonable VHF/UHF FM link, or as achieved on the higher HF channels during good propagation conditions.

Packet radio was not meant to be used in environments with noise, selective fading, sideband phase distortion, heterodynes from interfering signals, elec-trical static, over-the-horizon pulse radars, etc. While the Amateur Radio Service is making significant use of packet radio at 300 bauds on HF, there is growing evidence that shows packet to be less effective than SITOR for passing text message traffic under HF's present severe conditions.

The packet network protocol sets the maximum number of unacknowledged packets that can "fly" on the network at the same time. The AX.25 protocol permits a maximum of seven unacknowledged packets (the "window"), and usually up to 15 retries of an unacknowledged packet before issuing the "disconnect" command. (It is possible to set a link for an infinite number of retries although this is not a generally recommended practice.)

Because the receiving station must validate perhaps up to several hundred data characters in the block (packet frame), the pure mathematical probabilities of rejecting the packet frame are several orders of magnitude higher than in SITOR. The chances of having a wrong data character inside a frame have been estimated at 1 in 65,000 if the packet frame check sequence is validated.

Rather than receipt of a wrong character, there should be more concern with the loss of an entire packet, which frequently happens. If the link times out and is disconnected due to excessive retries, and many new "reconnects" are needed, the chances are very high that data will be lost. The unacknowledged packets simply vaporize into the great beyond and are gone forever.

The real questions are: "how many times will the packet link time out, be disconnected and a new connection required before all the data is transferred?", and "what is the net throughput rate?". How long does it really take to get error-free information transferred?

IS SITOR TOO SLOW?

SITOR has been acused of being "too slow for transferring a lot of information".

In fact, under the conditions typically suitable for the use of 45-baud (60 WPM) Baudot-Murray RTTY, SITOR running at the mandatory 100 bauds (throughput rate of 66 WPM) is about 10 percent faster! Under the poor conditions which would result in substantial errors in Baudot-Murray and ASCII RTTY, SITOR may slow down because of block repeats. Few, if any, errors will occur! Under the same conditions on HF, packet radio would probably not get the shortest information packet through (that would be at least 20 bytes, all overhead without user data).

SAREX-2 Testing Continues...

The Shuttle Amateur Radio Experiment #2 (SAREX-2) packet radio station recently underwent extensive testing at the Marshall Space Flight Center in Huntsville, AL according AMSAT Area Coordinator Ed Stluka (W4QAU). This testing was being performed in conjunction with the training of STS-35 Payload Specialist Ron Parise (WA4SIR) in the use of the ASTRO-1 experiment which will be primary payload on that shuttle mission. The primary payload, ASTRO-1, will be used to conduct a number of astronomical experiments. During the several days of testing, radio amateurs in the Huntsville area were invited to connect to WA4SIR and to receive a QSO number.This special packet radio station flying on STS-35 on May 9, 1990 will give each radio amateur who connects to WA4SIR a QSO number confirming their contact. When the connecting station sends their QSL card in with thiscontact number, they will receive back a beautiful QSL card commemorating this HAM IN SPACE shuttle flight. The SAREX-2 packet radio station consist of a Motorola 2M FM H/T with 5 watts output, a Heathkit HK-21 TNC-2, and a GRiD laptop computer that has a 40 MB hard disk drive to store the calls of all the stations connecting to WA4SIR during the nine day mission.The specially written software which will be running the SAREX-2 packet station is designed to allow for completely unattended operation and logging of the calls of allconnecting stations. It will also prevent duplicate QSO numbers being sent! Although no digipeating will be allowed through SAREX-2, connecting to this packet station will be like any terrestrial packet contact. Just use your TNC along with your 2m transceiver, and everything else is the same. After you have connected and received your QSL number from WA4SIR, on subsequent orbits you can watch for the SAREX-2 message beacons being sent periodically. The message beacons will contain information about the flight of STS-35 and other interesting items.Look for more information about the SAREX-2 mission in AMSAT News Service (ANS) bulletins and on AMSAT HF/VHF nets in the next couple of months. For more specific information about the ASTRO-1 payload, contact the SPACELINK BBS at (205) 895-0028.

MICROSAT Decoding Software...

The four recently launched MICROSATs are providing amateurs with reams of telemetric data. The telemetry protocol used is AX.25 which allows anyone with a TNC and a proper modem (PSK in the case of AO-16, WO-18 and LO-19, and AFSK in the case of DO-17) to decode MICROSAT telemetry. As is the case with all OSCAR telemetry frames, the information is a series of hexidecimal numbersthat must be translated into the actual parameters such as transmitter power, battery voltage or solar cell current.The AMSAT MICROSAT Engineering Team has written several programs to translate the frames into intelligibleinformation for use in determining the health of the birds.Currently the AMSAT/DRIG BBS [(214) 394-7438] contains several programs to decode telemetry decoding programs for the IBM and compatible PC used by the MICROSAT Engineering Team. The programs can take either "live" data during apass or stored data files and perform the translation into easily recognizable information. If you wish to decode the telemetry on the MICROSATs during a pass in real time, then use N4HY's TLMDC program. For post-processing datastored in a file after a pass one can use NK6KTLM.ARC program. And if you wish to examine a different format for displaying the telemetry, try G3ZCZ's software, G3ZCZTLM.EXE, Version 6.0.There are other programs being developed to not only translate the data, but also offer graphical representation of the data. One such program beingdeveloped is for the MacIntosh PC by WD0E. Currently in "Beta" test sites, the MacIntosh telemetry decoding program will translate real time or pre-recorded data, present multiple windows of raw and translated data, aswell as offer files that can be imported into standard spreadsheet programs. The MacIntosh MICROSAT telemetry program should be available in mid to late March from the AMSAT Software Exchange.To find out more about what programs are available from the AMSAT/DRIG BBS, contact AMSAT Headquarters at (301) 589-6062.

The Winnebiko III:

A Sneak Preview: A first look at the new Computing Across America system

by Steven K. Roberts

It's happening again. The road is mission, obsession, and lifestyle of choice. I have rented a house in the fringes of Silicon Valley, built a lab, and begun the long, long process of preparing machines, software, and bodies for the resumption of full-time nomadness.

The reason for all this illusory stability, of course, is the Winnebiko -- that perennial obsession of mine, at once mistress and tyrant... that vaguely bicycle-like extravaganza of surface-mount circuit boards and gleaming antennae. The machine is undergoing surgery so major that I have begun to realize that it's becoming a whole new bike, constructed of treasures imported from afar and mined here in the Valley, all layered together like a silicon spanakopita atop my faithful old recumbent frame.

This document is an attempt to characterize the new system, though it's dangerous to write about things that aren't done yet. Changes to this "spec" between now and late-1989 departure are assured, for every new bifurcated widgetframus that looks even halfway bikeable sets my wetware CAD system afire with system-enhancement fantasies.

I suppose I should first make a quick comment about the reason for all this. You've probably read the basics in other CAA publications: ticket to adventure, agile computing tool, combination of wide-ranging passions, gizmological door-opener, etc. None of that has changed; only grown more ingrained over the years, part habit, part obsession. There are a few new twists, though...

The next journey will be open-ended, and will take us overseas where rare is access to modular phone jacks, power outlets, and the whole automatic infrastructure of familiar American society. To do this right, I want near-total independence in all domains: computation, communication, electric power, propulsion, life-support, and so on. This escalates the Winnebiko system to a new level.

That, plus the original bottom line: it has to be fun. The battered old machine is obsolete. It's architecturally inflexible and much too hardware-intensive. Changes of function require soldering iron instead of editor. It does too little for its weight. There's no computing horsepower of any real consequence, there's too little solar power, setup of radio systems is a pain, and, well, it's just plain boring by current standards of engineering elegance. And so the celebrated switch-encrusted console system is being retired, consigned to a wood stand under a dust cover in the CAA museum where it might utter, now and again, it's synthesized query: "Are you going to ride me now, Steve?"

But rising like a Phoenix from the ashes of the past is the Winnebiko III...

* * *

I don't want to go into too much detail here, for a complete description will, quite literally, fill a textbook. This is an image painted in coarse, hurried strokes, only hinting at the complexities of what it represents.

First, the basic substrate: packaging. The new systems are distributed throughout the 12-foot bicycle-trailer combo, with most computer and control hardware in a streamlined console up front. This unfolds completely for service, and is designed to be autonomous, shock-isolated, and RF-shielded. Behind the seat, a second major enclosure carrries radio communications gear along with a breakaway radio-linked manpack computer systems, and a third subsystem devoted to satellite communication, HF, and power management lives in the trailer. All regions are linked by a power bus, high-speed data cables, multiplexed audio lines, and miscellaneous control cabling.

A major issue, of course, is power. My current system with 20 watts of solar panels, 12 amp-hours of batteries, and wimpy plug-in charger could never support all the new equipment. The bicycle will now carry 92 watts of solar panels, a regenerative braking system to turn hard-won potential energy into something more useful than hot brake pads, and switching supplies to take advantage of any external power source from a car cigarette lighter to 220 AC. All this dumps into a charge bus, which is tapped by dedicated controllers attached to three 15 amp-hour batteries -- one in the trailer, one in the communications equipment bay, and one up front in the console (plus a small one in the manpack system).

Managing that is one of the myriad tasks performed by the bicycle control processor (BCP) -- which is now a 68000 running FORTH, linked to an I/O expansion unit serving the whole bike and a network of other computers. There are dedicated microprocessors for text-to-speech synthesis, automatic transmission, satellite and ham station control, packet data communications, instrumentation and diagnostics, MIDI control, local area network management, security and remote operations, regenerative braking system, and so on.

None of this takes care of the applications layer -- that's all to run the bike systems. On top of the whole control environment is another network: two DOS environments (a 286 and a V40) to handle CAD, satellite tracking, mapping, text, database, and software development. One is quite enough in theory, but the 286 board is power hungry... I use the little one when waiting for keystrokes and am uninterested in spending energy on heavy processing horsepower. The two share a 40 megabyte hard disk, a 3.5" floppy, and a streamer tape backup unit. And there may be the innards of a Macintosh laptop as well, to support biketop publishing and other graphics-intensive efforts.

I carry a separate laptop in the manpack, of course, but it's a lightweight machine. When off-bike and needing file support (or wishing to check status of autonomous subsystems), I can sign on via packet datacomm in the UHF business band. The bike responds at a low BBS-like level, accepting a special command to boot the BCP for remote FORTH control of the whole system. If I want to get into the DOS environment, a reserved word boots the 286 and redirects console I/O via the radio link to my backpack system, eliminating the need to carry heavy hardware anywhere except in the bike itself where there is space for shock mounting. The backpack also hosts a 2-meter ham radio, as well as a full-duplex audio link to the bike for cellular phone access, local monitoring, security, dictation, and so on.

Any of the communications features can be accessed from any operating level, whether in RF-linked remote mode, via the handlebar keyboard while pedaling, or through the maintenance keyboard while stopped. Cellular phone modem, fax machine, packet radio, local network control... all are essentially servers on the network right alongside processors and file devices.

The new console is designed to be as flexible as possible. Most of its real estate is given over to a pair of LCD panels --one VGA backlit display (640 X 480) and the

other a more conventional laptop display. A touchscreen covers the VGA, and any processor can request either... depending on power budget, ambient lighting conditions, and resolution requirements. Typically, the BCP's status and maintenance functions are on the little one, and graphics-intensive DOS applications are mapped to the big one (the Mac display will flip down, exposing both at once). One particularly interesting project is computer generation of wireframe map models, showing from any viewpoint the earth's surface in my immediate vicinity with road vectors overlaid in bold strokes and my own location a blinking arrow. (The databases are on CDROM; my location is derived from a GPS satnav receiver; maps are drawn by the CAD package.) Entries from the contacts database can then appear as icons, which, when touched, expand into text windows. In addition, there will be a helmet-mounted display that presents text or graphics directly to my right eye at a comfortable focal length, with ultrasonic sensors detecting my head angle for mouse and window management. All this allows wider-bandwidth I/O with the neuron-based parallel wetware system under the helmet -- using speech, four display spaces, a thumb mouse, handlebar keyboard, and touchscreen as comm channels.

Other front panel devices include a miniature graphic printer for sponsor referrals and business paperwork, digital instrumentation for speed, cadence, altitude, temperature, time, inclination, elevation, torque, effective frontal area, and raw power measurements, and a minimal assortment of switches and LEDs to provide low-level maintenance access in the event of a major system crash. The important thing here is that everything on the bike, except for basic safety equipment like lights, is under computer control and thus completely hackable.

The architecture that keeps all this from becoming an interface nightmare is the key to the whole machine. I call it a "resource bus," linking as it does all nodes in the system --power, audio, serial, analog, and digital. The devices on the bus are diverse: a MIDI music synthesizer with handlebar keyboard or voice input, all dedicated micros, radio equipment, cellular phone, stereo, digital answering machine, printer, fax board, modem, nav system, speech synthesizer, audio function modules, and so on. The bus is only a bus in philosophical terms -- up close it's a massive FET crosspoint matrix with each junction controlled by a bit in a write-only memory. The implications are interesting: any interconnection is simply a matter of programming, which at the FORTH level is relatively easy. I'll be able to run phone patches between ham radio and cellular while mobile, remotely redirect local audio through an RF link to my pack if security is triggered, perform diagnostics, have the bike's speech synthesizer beacon on ham frequencies live updates of its exact location if it's moved without the correct password, turn alpha particle hits into MIDI "boing" events, fax out digitized video images via celphone or radio, receive and display satellite weather maps, and so on... all using the resource bus and some basic software drivers.

Mechanically, the new bike is growing in sophistication as well. I've never been happy with my brakes, so the new machine detects the first displacement of the right-hand brake lever as a command to begin proportionally drawing power from the trailer wheels via custom microprocessor controlled hub motors. A hard squeeze invokes a hydraulic disk brake on the rear wheel, and the other lever is a purely hydraulic link to a front rim brake. The transmission is changing too -- from 54-speed manual to 36- speed automatic. Here, the processor monitors speed, pedal torque, cadence, heart rate, and a keyed-in "wimp factor" that expresses my subjective robustness... changing gears to optimize the impedance match between bio-engine and wheels.

One of my big thrills in this has always been communication, ever since those primitive few thousand miles in 1983-4 with 300-baud acoustic cups and a CB radio. I've been carrying 2-meter and HF QRP ham gear for a while -- now there's an all-band HF transceiver built in for global communication, as well as 2-meter and 70cm multimode rigs and an amateur television station. There are three classes of antennae -- mobile verticals, folding beams, and dipoles... and there are spread spectrum data links between bike and backpack, my bike and Maggie's, and so on. But the best part is the new OSCAR-13 station (modes B and J): I'll be able to stop the bike, assemble a pair of crossed-yagi beams about 10 feet long, and fire up the satellite tracker software (it calculates Keplerian elements, inputs my coordinates from GPS or Loran, and displays a world

(cont'd on page 13)

by Lacy McCall, AC4X
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Read My Lips . . .

It is interesting how many times since the last presidential election that this phrase has appeared. I have heard it quite many, many times on television and lately I have seen it as a response to mail on packet. There are a lot of phrases and words that are overused today. Many carry a connotation that is far more than they deserve; "read my lips" is one that is not very deserving.

To begin with, it is saying pay attention. That happens to be on my all time pet list. People do not pay attention when others are speaking. In that sense the phrase may be deserving; but it is also carries an inflection that demeans. To my way of thinking if you have to demean a person with whom you have a dialogue, you are the loser; bigtime loser! Sure, you may win an election, or you may make you point; but if you want someone to listen, just ask them. If you think the other guy is stupid, at least be man enough to say it. We all use redundant English, like using the word "basically" as a preface for a profound statement. We can do better.

Prince Charles has recently taken on several dragons. One is the pitiful sight of the surroundings. I am particularly sensitive to this and sympathetic to his arguments, being an architect. One other of his targets has been the lack of communicative skills. He has led the way and I hope many in England and elsewhere are paying attention.

If you have to respond to barbs from others via ham radio or other means, please use restraint, intellect and don't tell anyone to "read your lips." After all, if you make that statement on packet you are the real dummy. Everyone knows we can't see your lips.

TRAINS AND THINGS...

It is unclear how much appreciation of poetry, there may be among the Digital Amateurs. From the one's that I know, I suspect it may be appreciated, so I dare to give it a try. From a poetic standpoint, I usually spend a lot more time and dealing with much more sensitive and delightful subjects such as love and beauty; but to make a point I will try anything once ...

Once there was a train to Spence, and another much the same, both ran the track but one stopped at each town, the other was "Cannonball" by name.

Too there were the makers of goods, who needed to ship their wares, at first it seemed simple to use the train that was slow and had the best fares.

It made no difference the time, and anyhow the route was the same. From Spence the goods traveled to Knott, where only the Cannonball came.

But a wise man started to think, what if I go for speed? Soon he figured it all out, "Be first and you will succeed."

He used the same hauler to the station to ship, but he chose the fast route, and paid more for the trip.

When his goods reached Spence, he was by far way ahead, the Cannonball roared to Knott, where his products soon led.

What he found was that it made no sense, to take the slowest route. "Use the speed!" he said, "Use your head!" now he's the man with the clout.

The same may be true, when we wake to see, that the computer we use, is superior to the TNC.

(Author's Note: You may want to read it twice before continuing!)

FROM THE BOTTOM UP ...

Many people never give a thought to what happens to the radio signal that is processed by a Modem. Most will understand that the modem is an integral part of the Terminal Node Controller hardware. To walk through the signal processing, let us look at a simplified version of what happens. This is written as best is possible in very uncomplicated terminology, and it is very difficult, as you will see, to discuss a complicated subject in simple terms.

First, forget what kind of radio signal it is or how the carrier is modulated. Just assume that the radio is creating some kind of noise that a radio receiver can hear. The radio hears the signal, and outputs it to the speaker, or some jack that is connected to the TNC, and now humans can hear the signal too.

Inside the TNC, the first thing to hear the signal, is the modem. To modulate or de-modulate is what a modem does, but as far as we are concerned all it does is to hear the signal, just like we do. The difference is that the modem understands the language, which is noise to our ear, and it translates for us. What it turns out is the on/off pattern it is hearing. In other words, it turns the radio frequency signal into a pattern of bits which are either on or off. As we all know, on is translated to 1 and off is translated to 0; hence binary math has only two conditions on and off.

So far this is pretty simple. Now the plot starts to thicken. The modem chips used in most TNC's are like the 7910 so called "World Chip." Before this modem-on-a-chip will release the signal, it must meet a standard programmed into the chip. That standard is what we call AX25.

Now the modem chip hears all the 1's and 0's, but do they fit the pattern that it is looking for? The precise pattern is a start and stop signal which identifies the complete package of information that is being sent. If the modem sees a start character, which is the same as an end character, it assumes that all data it is receiving is part of the package, until the next start/stop, when the process begins again.

Never mind some of the really smart things a modem does, like the "bit stuffing" to allow clear definition of the start/stop from the same character sent as part of the data; or may look for parity bits, or a variety of bit patterns. All we need to know is the as it's final product, the modem hears the data, and from what it hears, it finds the package that was sent.

That is the end of the modem chips usefulness, from a practical point of view. It may do other things such as tell us when it detects a signal, but all that is important is that it turns all that radio noise into a package of 1's and 0's, getting rid of the start and stop characters.

Once the modem has the package, it is sent to the next player in the chain. In the case of packet, the data is decoded as 8 bits per character, and Baudot only 5 bits per character; but this still is not important. Since most computers deal with 8 bits at a time, the modem does all that translation and ends up providing 8 bits, which all of a sudden are recognizable when we print them out on a computer screen as ASCII code.

Some TNC's stop here and provide only the modem and the necessary chips to send the translation to the computer or serial port. Such is the case with a product like Pac-Comm's PC120 or the DRSI PC*PA adapter. These two plug in boards for PC Compatible computers are relatively simple and rely on the computer to pick up the ball and do what it likes with the translation.

Other TNC's like AEA's PK-232 have many other chips and in fact have their own Central Processing Unit (CPU) which itself is a small computer. This computer has

Programmable Read Only Memory (PROM) chips connected to it which include the program that controls how the modem data is treated. By typing various commands, at the computer, the TNC knows via the PROM code, how to process what it receives from the modem. Then, it sends the information to the computer through the cable you have connected between your computer and the TNC.

Now we see how the data got to the computer; either pretty much "raw" data from a simple modem chip or fully processed and de-coded data from a computer in the TNC. But what does the computer do?

Starting at the other end of the chain, we all know what a terminal program is. It is a program that activates some port, usually a serial port in the case of PC Compatibles, and waits to send and receive data from what ever we connect to that port.

What radio operators have connected is a TNC. It may be connected to the serial port, or it may be talking to the terminal program via the computer buss if it is an internal board. From the standpoint of what happens, it makes absolutely no difference.

The terminal program is our window to the data. Assuming that our TNC is very smart, like the PK232, what it sends to us is already processed into very clear information. It may be the response to a command we have typed or it may be a Packet or it may be characters received using Amtor or Baudot.

On the other hand, if the TNC is not overly smart, the terminal program may have to do some work, before it prints to the screen; or in some cases, like the DRSI's PC*PA board, there may be some middle man out there, like the Terminate and Stay Resident drivers shipped to you along with the TNC. This simply filters and processes the data actually received by the terminal program.

As you can see there are only a few steps in the main chain and it is clear how the AX25 tag is applied to what we do. What also becomes apparent is that an outboard TNC like the PK232, is very smart. But the curious part of the smart TNC is why do we use a Z80 processor in the TNC to do the work that we may have the 80386 do in the computer. The Z80 is an old 8 bit workhorse, while the 80386 is a high-speed 32 bit processor.

It has taken us a long time to get to end of the chain, and to see the alternatives, but from here, I for one think that the outboard so-called "smart" TNC will soon be upstaged by a much smarter cousin, the computer program which takes raw data and does the work of processing in the computer.

The TNC circuitry in a board such as the PC120 may not be sophisticated enough to give the computer enough information for full processing, but it won't take much.

THE TOP END ...

All the above comments, apply to what we call Level 1 and Level 2 when we discuss packet transmissions. Then there is Level 3 and upward, each repackaging and creating a larger box to send via the radio.

The way we started out handling this with Net-Rom was to put more PROM's in the TNC to do more processing and to get the package inside the package for our computer. Now we see that the code is better handled again by the computer. This is being done by the G8BPQ Software Switch, which not only performs the Net-Rom functions, but TNC coding as well. All this is done right in the computer.

In the long run, simple boards are very inexpensive. Software is easy to upgrade. Conversely, PROM's are much more difficult. To be able to easily increase our capability, we must move most of the processing to the computer.

EPILOGUE ...

This article is a little far out when you compare it with the technical information of great value contributed by the other writers for this publication. In fact, you might call it far out in any publication, but I hope it made a point that has been puzzling me for a long time. Why do we put so much coding in the TNC?

At last, maybe it is clear. The people developing the products we use are afraid of the computer software authors and comfortable with the in-house programmers who write the coding for the PROM's. Also, the PROM system, offers protection from piracy and copying. This is logical and not easy to overcome, but without a doubt the end of the smart TNC is near. One good board, with a superior modem, and signals to the computer about the characteristics of that signal and zap! All there will be is a pile of metal and silicon dust.

TEASER OF THE MONTH ...

Next time you have some equipment failure in your shack, stop and think what you are called. You are a radio amateur. By definition, the dictionary I have describes the noun 'amateur' as follows:

1. Devotee, Admirer 2. One who engages in pursuit, study, science or sport as a pastime rather than a profession. 3. One lacking in experience or competence in an art or science.

My thesaurus gives the following words as alternatives for the noun 'amateur':

beginner, dabbler, dilettante, hobbyist, layman, neophyte, nonprofessional, novice, part-timer.

Personally, I am a radio dilettante! How about you? Sounds good anyway. Maybe these definitions will help you figure out why all that equipment you own never works!

By the way, before we leave the topic, you should know that the word 'amateur' is derived from the latin word 'amator' which means lover.

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by Mike Bryce, WB8VGE
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Portable Power Considerations

The last few months of the decade really threw the hams into the public eye. Hurricane Hugo came ashore on the East coast causing widespread damage. On the other side of the country an earthquake rattled the bay area of San Francisco.

Hams came to the rescue and supplied communications to the areas hit. As I was listening to all of this on the many nets, I wondered just how many hams were able to get on the air? Under less than perfect conditions. Sounds a lot like Field Day. Before Field Day comes, many groups plan ahead and have everything ready to go.

So I wonder. Right now, this very minute, if all hell broke loose would I be ready to go on the air? In less than perfect conditions.

Depending on the situation, I would pack up the following:

The Ten-Tec Argosy would be my first choice. Followed closely by the Argonaut. The reason? Both radios support SSB operation. We have to bring ourselves into the 90s. CW alone is not the answer. Packet, AMTOR, and RTTY can be supported with a SSB radio.

Since the Argosy can run at 100 watts input, I would have enough power to get through the QRM. Running on battery power is possible. Even longer operations can be had just by switching over to five watts input.

By the nature of QRP, the use of battery power is quite possible for powering coast to coast communications. Selecting the battery to power your gear is just as important as selecting an antenna.

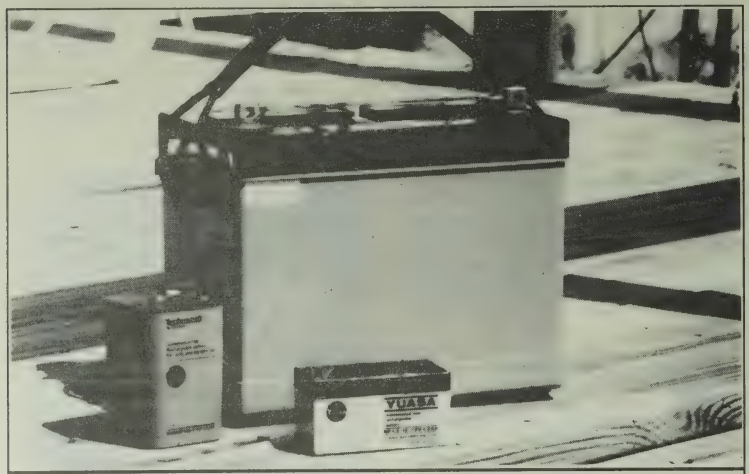
We have many choices to chose from. I opt for the sealed lead-acid battery. These are known to most of us as a Gel/Cell(TM). This is a copyrighted name by Globe Battery.

The Gel/Cell(TM) is a gelled electrolyte, maintenance free lead-dioxide battery which exhibits high capacity and a very long life when properly applied and charged.

These batteries have a high current capability; very wide operating temperature range; immunity to catastrophic failure due to deep discharge; and absence of memory characteristics. As a result of these characteristics and its overall safety, the Gel/Cell(TM) is the preferred battery in a variety of portable and standby power applications.

Gel/Cell(TM) electrochemistry is very much like that of a common car battery.

The basic componets in a fully charged Gel/Cell are lead-dioxide (PbO_2) positive plates, a gelled dilute acid (H_2O and H_2SO_4), and sponge lead (Pb) negative plates.



Gelled batteries come in all sizes and voltages. From 50 amp/hour units to 1.5 amp/hours shown here. Larger and smaller batteries are also made.

When the Gel/Cell is connected to a load it produces power as the positive and negative plates become converted to lead sulfate, and water replaces the electrolyte.

A totally discharged lead-dioxide battery would have the positive and negative plates mostly converted to lead sulfate and the H_2SO_4 would be converted leaving water or very dilute acid in the gel.

When a charger is connected to the discharged Gel/Cell, the water in the gel and the lead sulfate covering the plates combine to reform the acid of the gelled electrolyte. In the process, the lead-oxide and sponge lead of the plates is reformed and available for repeated reaction.

The terminal voltage of a Gel/Cell can be quite easy to compute. Just a digital volt meter is all you need.

The open circuit voltage of each cell of the Gel/Cell battery is approximately 2.12 volts. The cell voltage is higher for a battery that has just been taken off charge; but in all instances it should adjust to about 2.12 volts after a period of time.

As the battery is discharged, the terminal voltage will slowly decrease. For example, when the battery's rated capacity is removed over a 20 hour period, the terminal voltage would decrease to 1.75 volts per cell. For a 12 volt battery, a fully discharged battery would read 10.5 volts.

Gel/Cell batteries are rated at room temperature and at a 20 hour current rate. This means a 2.6 A.H. battery, for example, will put out .130 amps for 20 hours (20 hours X .130 amperes = 2.6 amp hours). This does not mean, however, that it will put out 2.6 amperes for one hour. A 2.6 A.H. battery will actually put out about 1.7 amperes for one hour. Therefore, the capacity of a 2.6 A.H. battery at the our hour rate would be 1.7 A.H. However, if given a "rest" the 0.9 A.H. remaining may be used for powering the load again.

It is typical for all battery systems as the rate of discharge increase, its available capacity for that discharge decreases.

A Gel/Cell battery can be used in either a type "A" or type "B" applications. A type "A" battery is conservatively designed for 4 to 6 years of continuous charging in standby powered applications. During this period over 100 normal discharge-charged cycles can be expected. Even more are obtained if only minor discharges are experienced. The "end of life" is actually determined when the equipment will no longer perform its required function. Since the battery may still have 40 to 60% of its initial capacity - the service life may be

much longer. In most cases the Gel/Cell battery we find on the hamfest table came from this type "A" service. Most likely from emergency lighting systems.

In type "B" service the battery is designed to provide 3 to 5 years of service in standby power applications or 300 to 500 normal discharge-charge cycles.

When installing a new Gel/Cell in type "B" use, initial capacity is only 80-90% of its normal rating. After several months of use or 30 - 40 complete charge cycles, the nominal rated capacity is reached.

The capacity then remains near the rated value for up to 150-200 cycles. After 200 cycles or so, the battery capacity slowly falls. Again, the "end of life" occurs when the battery capacity is no longer suitable for a specific application. If only minor discharges are experienced, up to 1000 cycles may be achieved.

The key of course is monitoring the voltage of the battery. In the next article, I'll have some more thoughts on the Gel/Cell batteries. Also, I'll be looking at some simple charge circuits you can build to keep those batteries in tip-top shape.

(cont'd from page 9)

map showing the bird's location, azimuth/elevation values, doppler shift, pointing angle, and other parameters). With this satellite, I have a hemisphere of coverage at a time during a dozen or so windows a week from anywhere in the world, with the ability to communicate via full-duplex audio under solar power. The uplink power is 25 watts... and the satellite's orbit takes it out to 22,000 miles at the apogee (2.8 earth diameters).

Let's see... what else? Oh -- what to do with extra solar power from the 92 total watts available in full sun (7.6 amps of 12 volts)? Simple -- the software can either throw it into the wheels for a .1 horsepower boost, or use it to cool Peltier-effect solid-state cooling devices installed in my helmet and buried in an insulated space behind the seat. This should have some soothing effects, including cold beer in a hot desert (one of the world's great pleasures).

There are various standalone additions -- a miniature PC-linked digital oscilloscope with outboard spectrum analyzer, a butane soldering iron, and countless improvements to the camping and touring gear. But you get the idea... this system is an all-out effort aimed at creating a self-maintaining mobile autonomous information platform, constantly in communication with a worldwide network while freely wandering the earth's surface under human and solar power, supporting a freelance writing business and providing unlimited fun to the rider and companions.

Now that's the kind of design spec I like.

Oh. I did mention the word "companions," didn't I? Two things are happening that involve other people.

First, I've been putting the word out for a while that we're looking for a few exceptional people to take up this life of nomadness with us. The responses are trickling in... there seems to be a hunger for adventure afoot in the land. If you're interested in knowing more, let me know.

Second, the dozens of human intellects and over 100 energetic companies that are cooperating on this new machine represent a truly dazzling resource of creative ability. For almost six years, I've been collecting wizards... and with some of the very best I am now forming an ad-hocracy with two linked goals: market Winnebiko spinoffs and take on selected consulting projects. If this one sounds interesting, give Nomadic Research Labs a call at 408-263-0660. We need help on some of the new bike systems, and I get a lot of requests for consulting time... there's plenty of work to share.

That's enough for now. As the months wear on and the weather turns seductive here at the base of the Diablo Range... as summer days tease me with thoughts of whistling descents and slowly changing vistas... as the legs tense in rhythmic urgency here in my static space... I'll grow ever more desparate for the road. It's out there, an infinite thing of wonder and possibilities, unhurried, patient, waiting. I pound away on eccentric machinery, implementing dreams, thinking all the while of that cold beer in the desert. Soon the adventure will toggle once again from intellectual to visceral and the real stories shall resume.

In the meantime... cheers from the lab!

Steven K. Roberts, 98 Sudbury Drive, Milpitas, CA 95035 voice: 408-263-0660 GEnie: wordy CIS (rarely): 72757,15 uucp: wordy@cup.portal.com well: wordy

DB2OS Reports FO-20 Mode JD Operational...

AMSAT Ground Command Station DB2OS reported that he was able to connect to himself using FO-20's Mode JD transponder. This occurred on orbit #95 over Europe on Febuary 14, 1990 between 10:56 until 11:20 UTC. Thestation call of FO-20 is 8J1JBS. Peter also reports that FO-20 had a beacon message which said that whenever FO-20 was in Mode JD, it would be possible for stations to digipeat through the Mode JD transponder. Also, N4HY reports that he was able to make a QSO through FO-20 Mode JD to W9DIO.To date no operating schedule for FO-20 has been released from JARL. As soon as AMSAT officials receive a schedule, it will be included in the AMSAT New Service (ANS) bulletins.

AEA...

has announced the introduction of a new "Isoloop" high frequency antenna. Developed by Professor Donald K. Reynolds in association with Mike Staal of M2 Enterprises, the Isoloop tunes continuously from 14 to 30 MHz and has a power rating of 150 watts. Measuring only three feet per side and square in shape, its typical SWR is 1.5:1 or less over thc entire frequency range, depending on environment. The Isoloop is remotely tuned by a supplied control box and its compact design makes it ideal for attic or balcony use. The Isoloop will be available in March. For more information write Advanced Electronic Applications, P.O. Box 2160, Lynwood, WA 98036, or call (206) 775-7373.

by ***Ben Williams, AA7AS***

RR 1, Box 4272 • Glasgow, MT 59230

HAM RADIO & THE AMIGA

An Introduction

About Ben Williams (by Ben Williams)

33 years old, no children, 4 cats, 1 dog.

I'm married to Dr. Anne M. Williams, MD, FACS - her call is N7LWZ (she's a general). We have immense amounts of things in common, and we met on a computer network - CompuServe, in fact. We both were waiting when the trucks unloaded the first Amiga 1000's, years ago - and years before we knew each other. When I married her, I changed my last name to hers... as it happened, I got my new callsign then, too. It's an interesting set of feelings. Who am I, anyway!?)

My father was a science fiction writer and critic, my mother a literary agent and a writer. My sister is a french->english translator, technical writer (computers, no less), a nurse-midwife and a mother. She keeps me humble.

My Hobbies:

Photography, mineral collecting, spelunking (cave exploring), old coins and stamps, ham radio, karate, motorcycle racing, reading science fiction, writing technical articles, chess, Guitar and Bass playing, classic computers (Altair vintage), collecting watches.

Favorite toys:

An Amiga 2500/030; a nitrous-oxide supercharged Suzuki 1100 Katana; a Kenwood TS-940s and r5000; and my Yaesu collection: FT-980, FT-736r, FT-23, FT-470, and an FT-9600; last but not least, my lapidary saw.

I have a black belt in karate, and am instructor and international referee certified. I also hold an extra class ham license (AA7AS, ex-N4EJI), and have the rather doubtful honor of owning an expired first class FCC license.

Worked for:

IBM (Boca Raton), Arcade Engineering, Bally-Midway, Analam, MCI, TechStar, CanAm Electronics, Lafayette Electronics, Sa-Jul Vending.

Currently occupied:

Working as V.P, Engineering for Black Belt Systems, a Montana based Amiga development firm.

Products currently being sold by Black Belt that I wrote or designed include the following:

Printed circuit board CAD system & drivers; Communications program; SSTV/FAX system (now owned by AEA inc); 6805 cross-assembler; C Applications boilerplate; SoftPanel discrete LED display; Front end for Heathkit digital oscilloscope; Schematic capture program; Various utilities on the ToolShed diskette... Encryption tool, document analyzer, priority controller, Auto source code document generator, pretty-printer, File conversion tool, file reader, requester library.

Products released into the public domain by Black Belt that I designed include:

The JakeBoard, a "logical" keyboard to allow the handicapped to manipulate the Amiga (and the bridgeboards) with just a trackball and two buttons;

FT-9600, a remote control program for the Yaesu FT9600 60-900 Mhz receiver;

Products on the horizon include a 256,000 color adaptor for all Amiga models 500-2500/030, group III fax system, and a 16 channel analog input board.

Hello, and welcome to our new column dealing with ham radio and the Amiga computer. This issue, we'll introduce the Amiga computer to those of you who don't know what this marvelous machine is all about. I'll also tell you some of the reasons that make me believe that the Amiga is the absolute best computer to have in a hamshack; and I'll mention some currently available ham-related software that should leave you eager to learn more. If you're an IBM or a Mac (or other machine) owner, don't skip this first column - it's worth your time to see what this new system can do - I promise.

The Amiga is a new computer, when compared to the IBM, its clones, or the Mac. Introduced about four years ago, the Amiga provided capabilities that were totally revolutionary at the time; and are still unmatched at anywhere near the price today. Examine these standard, out-of-the-box features:

* Multitasking operating system; * Color resolutions up to 4,096 simultaneous on screen; * Spacial resolutions up to 704 horizontal by 480 vertical; * 33 (yes, thirty three!) different graphics modes; * Hardware DMA-driven "sprites" for pointers and so on; * Multiple graphics resolutions on-screen at one time; * "playfields" - prioritized planes, with independent color registers; * 4-channel DMA stereo sound, line level, 8 bit resolution/channel; * Dual light Pen interfaces; * Dual "switch" joystick interfaces; * Dual "analog" joystick interfaces; * Dual mouse interfaces; * Completely bitwise bi-directional parallel port; * Full 25 pin RS-232 Serial port; * 880k "stiffy" disk drive, connector or bay for more; * 256 logic operation bit blitter; * Hardware raster line drawing (including patterned lines); * Hardware raster area fill (multiple types); * Full keyboard w/keypad, Fkeys, etc; * Quality mechanical mouse; * Genlock capable - inexpensive interface to ATV; * Real time clock; * Standard NTSC video scan rates - you can record right to a VCR; * Unlimited speech sythesis built in; * Unified printer system - all applications work with all printers; * 512k to 9 megabyte main ram; up to 32 gigabytes on 2000 series.

Now - does that sound like a dream machine? Does it get better when I tell you that the base price for the computer is only $600? No kidding! A "real" system also requires that you purchase an RGB linear monitor and (in my opinion) at least another megabyte of memory, for a total of 1.5 megabytes. That puts the "real" cost of the system in the $1,250 range, even less if you shop around. There are other models of the Amiga that cost more - the base

machine has a 7.16 Mhz 68000 processor in it, but you can buy machines with up to a 25 Mhz 68030 CPU plus 25 Mhz 68882 math co-processor. These machines cost considerably more of course, but are capable of easily running rings around a 33 Mhz 386 Dos or OS/2 machine.

No computer is worth anything without a DOS and BIOS (Amiga users consider these together and call it the KERNAL) that takes advantage of all these features, and the Amiga series is no exception to this.

Almost all of you should have seen an IBM pc or a clone by now. These machines typically use what is called a Command Line Interface, which Amiga people refer to as a CLI. The Mac uses a Graphic User Interface (or GUI) that utilizes a mouse for point-and-click types of operations. Both ways have advantages and disadvantages for various uses. The Amiga has both interfaces - you can use either one, or you can actually use both, which brings me neatly to my next point.

The Amiga is a multitasking machine. That means that it can do more than one thing at one time. You can be running your word processor, while you are online to a BBS downloading files, while your database is busily churning out a report for that last contest, while your SSTV program is processing interference out of an image, and while your printer is printing out that last beautiful 4096 color picture you received from overseas... and while the machine is playing Bach or Thriller in the backround. The only limitations to the number of tasks you can perform at one time are (1) the amount of memory you have installed in the machine, and (2) how good you get at mental jumping through hoops. The computer won't have trouble - but it gets just a little hard trying to keep 6 or 7 major applications busy.

Of course, some applications keep themselves busy. Packet programs, for instance often just sit there and log what is going by. BBS systems handle callers without interference from the system operator (You). Comm programs download without supervision, and printers print documents and images as long as some piece of software sends data to them. There are other classes of software which run all the time, to your benefit. Cron programs are a good example of this. A cron program uses a data file you write (in english) to remind you of things you need to do. Mine tells me each day at 20:00 GMT that it's time for a schedule with my brother in law. And it tells me - it doesn't put up a window - it uses the built in speech sythesis system.

All of this has many implications. You won't ever need to buy a print spooler - because the fact that an application is printing doesn't "take over" that machine; and if you need to, the machine itself can spool prints internally. You don't need more than one computer, no matter what you do with it... at the most, you'll have to get more memory, or in truly extreme cases, you might want to buy a CPU accellerator to get all these things to run faster.

When I talk about multitasking, I'm talking about programs that run completely independantly of each other. They each think they have the whole machine (or whatever parts they needed to get at) and they all run concurrently. That means if you are working in the word processor's window, the spreadsheet is still able to recalculate - it's not "suspended" in any way, unlike MS-DOS windowing systems.

People often ask me about the programs for the machine, if they interfere with each other. I've even seen a joke about it, which pretty much says it all. It goes like this:

Q: The IBM has it's TSR's (terminate and stay ready) and the Mac has it's desk applications. So what does the Amiga have?

A: Programs.

You see, the Amigas DOS runs each and every program from a simple scientific calculator to the biggest desktop publishing system in the same fashion. They get started, they ask for an amount of memory, DOS gives it to them and tells them where it is, and they run. It's as simple as that. If they need to open windows or graphics screens to communicate, they do that too, by asking the system for them. Every window and screen is managed by the operating system, and there are no conflicts.

The Amiga has the extremely unusual capability to run in more than one graphics resolution at once. It does so by manipulating graphic areas called "screens". A screen is a vertically scrollable graphics area of a particular resolution. For instance, one screen might be 640x400 and allow 16 colors per pixel, while another is 320x200 and allows only 2 colors. These screens exist "in front of" one another, like multiple window shades. You can pull a screen down, like a curtain, and as it moves down it reveals the screen behind it. Each screen can contain one or more (up to any number) of windows - each window on a particular screen can have as many colors as the screen itself. You can have many screens open at one time, in any combination of the basic 33 graphics modes, with any number of open, operating windows on each screen. This allows paint programs to have many-colored screens open while a DTP program has a black and white screen open too. Not only will these screens slide up and down like curtains, but you can "pop" them back and forth, or cycle thru them one by one, instantly with the press of a key or a click of the mouse.

An important issue to discuss is Applications software. In fact, all of the above would be pretty but useless without a good applications base. Well, it's there - and for ham operators, it closely resembles heaven. Packet radio BBS and users software. TCP/IP node software. SSTV and FAX software. Mapping software. Satellite tracking software. Database software (that handles images!). CW practice. Great circle programs. Remote control programs for radios. Paint programs that use every ounce of graphics capability. Titling programs with scroll, zoom, rotate, illuminate and more for ATV genlock use. Desktop publishing for QSL card generation, newsletters and more. Graphic time-zone clocks with visible grey line. The fastest architectural CAD package on any personal computer. PCB layout. Schematic capture. Logic simulation. Spice analog circuit simulation. Cross assemblers. Basic, Lisp, Pascal, Forth, Comal, Modula, C, C++, Logo, APL, COBAL, Fortran, Rexx, BCPL, ICON, and more. Over three thousand different collected PD disks. Spreadsheets, word processors, business graphics, and the rest of the "usual" software every machine has (or should have).

Another really good point of the Amiga system is not immediately obvious until you stop and think about it. It's something that no other common pc has - and that is a broad base of standard hardware. You can get high resolution graphics - for a price - on the IBM and the Mac. But do the applications support it? Often, you'll see programs that work in PC CGA mode because it's the "lowest common denominator". They know that things will work with it. With the Mac series, many machines are single bitplane (two colors) and the developers write for that, knowing that if they do not they lose a large share of the market.

On the Amiga, all developers can use any graphics mode from 4096 colors to 704x480 and not worry a bit - all the machines have the facility. The same goes for quality sound in games and music programs. All the machines have the hardware, so the programs potential market includes all the Amiga owners who want

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the capabilities your software offers. There is only one disk format to worry about, 880k/floppy. All the machines have the same operating system. No one has had to make a windowing system that "sort" of works, because the machine has a good one built in. No one has had to make a multitasking OS, because again -they all have it already. As a result, you end up with a huge base of software that:

* Works with all other software - at the same time. * Uses the maximum set of capabilities that are appropriate. * Doesn't require the purchase of expensive hardware add-ons.

That's just the beginning - are you thinking about compatability? For about $125, any Amiga turns into a Mac. Compatible except for one thing... the Amiga runs the Mac programs faster because of it's built in graphics coprocessor. Perfectly legal, too - you buy the board form the vendor, the ROMs from an Apple dealer, and plug them together. Presto! You have a Mac and an Amiga. There is a clone simulator that runs IBM software applications.

If you get the bigger model Amiga (add about $500 to the $1300 estimate I made earlier) then you can have XT or AT software and hardware compatability. The Amiga can run the MS-DOS software at full speed, while it's also running its own applications. There are PC-AT compatible card slots, too, so you can add all manner of things to the system. Amiga, Mac, and clone capability, all in one one normal sized computer chassis. Amazing. No, Amiga!

You might be curious how the Amigas ham software stacks up to that available for other systems. I can speak from a position of authority on some parts of this issue, because the company I work for (Black Belt Systems) is the one which designed AEAs "AVT System", the SSTV/FAX system for the Amiga. The AVT handles fifty-five slow scan modes, including all the new european modes and all the color modes, and it runs 9 fax modes. Resolution is as high as 320x400 in 4096 colors for the SSTV, and 1024x1200 in 16 grey levels for the fax modes. I regularly pull in GOES, NOAH, and newsfax images directly from satellites and off the HF bands. I also have a Robot 1200c, which is a very nice stand-alone unit that runs 8 SSTV modes (all of which the Amiga runs as well). The entire Amiga system in the hamshack, including the monitor, Arexx software, extra memory and the AVT system cost less than the Robot unit plus monitor does - there is just no contest for value; after all, the Amiga is a general purpose computer. Picture quality? The 1200c has only 256x240 pixels (a total of 61,440) to the Amigas 320x400 pixels (a total of 128,000) - again, no contest.

For packet, Black Belt Systems has customizable software that can turn any TNC into a point and click environment. I use the PK-232 myself, because of the time division multiplex and NAVTEX capabilities - I'm more of a short wave listener than a sender - but the program supports all TNCs by using user-definable configuration files. I can point at, then click on an icon for any function, such as setting time values, sending "brag" messages, or any function the TNC will do on command, and watch it performed by the program. No typing, unless I have something to say.

The Amiga also supports inter-process communications, in the form of the ARexx language. I can sit in the car downtown, call my Amiga in the hamshack on packet, and tell the packet system to instruct the SSTV system to load a particular image, set the SSTV mode, and transmit it out. Shortly, I'll be able to tell my Kenwood TS-940sAT to tune to a particular frequency also - I'm just waiting for the TS940 control program to arrive in the mail. ARexx is essentially a language that allows you to write short macros or long scripts that perform any task you can imagine. ARexx can be thought of as being equivalent to the BASIC language, except it can tell any application running in your machine what to do. And to top it off, it can start any application up from scratch. So if I'm downtown, and I want to kick on my transmitter, I can do this:

1)Log into the AA7AS packet machine in the normal manner.
2)Type "access [password] run AVT_Master<c/r>"
3)Type "address 'AVT_Port' <c/r>"
4)Type "cwid AA7AS; speak this is A A 7AS inglasgow;<c/r>"
5)Type "speak montana, operating remotely from the packet; <c/r>"
6)Type "speak unit in my mobile on 2 meters. I am monitoring; <c/r>"
7)Type "speak using my shortwave portable. Anyone around?; <c/r>"

There is no limit on this type of operation; you can start any program, check results, read files, you name it - you can even move the mouse pointer remotely via ARexx using scripit, a free program by Khalid Aldoseri. ARexx is a $33 investment that most informed Amiga owners make soon after purchasing the machine.

Starting in the next column we'll go into detail about specific items of software for the machine, beginning with the AVT SSTV/FAX system itself. If you are more of a curious reader, I hope I've tweaked your interest here. The Amiga costs less than many accessories for the hamshack, like the Robot 1200c, yet is more powerful and flexible than any other personal computer on the market. I hope you'll see fit to consider adding an Amiga to your shack. If you want to know more about the machine, try tuning in 14.233 Mhz, upper side band. You'll find a group of Amiga users there at almost any hour the band is open, located from Hawaii to Scotland and all through the United States. They'll be glad to try and answer your questions, and can point you at cost effective ways to get started.

Until next issue then - 73 from AA7AS!

ICOM AMERICA...

has installed a toll-free literature request hot line for its retail customers. Those in need of information can request any Icom literature by calling (800) 999-9877. The line will be answered automatically and you will be asked to state your name, address and the literature you are requesting. Your request will be mailed to you the next working day.

WEBERSAT Picture Testing Continues...

It is a well known axiom among photographers that if you want to take a picture of something, you must first point the camera lens in the right direction. However, in outer space it is sometimes impossible to know when your picture taking satellite will be pointed down to earth. This is what the engineers of WEBERSAT-OSCAR-18 have learned from their recent picture taking efforts. Chris Williams (WA3PSD) of Weber State University reported that of the six pictures taken so far, most did not contain anything very interesting to look at. One of the pictures appeared to be taken of the sun and another appeared to be a picture of deep space. The others seemed to be brighter on one side than the other. Another consideration in the picture taking process that needs to be taken intoaccount is that the field of view of the CCD camera aboard WO-18 is about 20 deg. Anything outside of that is not seen. So if the spacecraft at the point when the shutter is snapped is moving or rotating away from the earth'shorizon, the earth will be missed.

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by Jim Mulvey, KS1A
60 Serenity Dr., Tewksbury, MA 01876

Digital Mobile - Briefcase Style

This whole business of operating RTTY and AMTOR and PACKET gets more exciting all the time. It's NEVER boring. Need some ideas? Let me give you a couple that both the beginner and EXPERT might want to try!

First, there is no excuse not to be on the digital modes. (YOU CAN SKIP THIS PARAGRAPH IF YOU ALREADY KNOW HOW HOT THESE MODES ARE!) Here is the place where REAL ON AIR CONVERSATIONS TAKE PLACE! No "59 Tnx QRZ" here! The average RTTY contact is about 30 minutes and you actually get to find out about the other person. Then there's the fabulous AMTOR, with it's error correction. What you see on your screen is exactly what the other guy typed in. If he says, name is "Jamexs" . . .his name is really Jamexs. AMTOR is much faster than Packet and so it is becoming the mode of choice for emergency and civil defense work. It's terrific for rag chewing! PACKET is out of control fantastic with the DX spotting nets, the National Traffic System messages you can send so efficiently, and the large amounts of bulletin boards to get help on. I dazzle the non-digital hams all the time with Packet. Just the other day a friend was looking for a schematic for an old obscure rig. I told him I'd put out the call for help on the Packet Bulletin boards. I entered it on the local Boston board and marked it for distribution on all the New England boards. (I could have marked it for distribution to every BBS in the US!) In five days he was amazed to have the manual in his hands. I can't begin to tell you how great Packet hams are when it comes to giving a helping hand.

I seem to know a lot of innovators. People who like me, are always trying to do new, fun things with the ham gear. I reason that once you buy and use a TNC you don't have to keep it bolted to the ham shack desk! Wouldn't it be great to do what you're not supposed to do? Take the TNC off the desk and do something like this: Put together a briefcase sized mobile station that you could take on trips, complete with a RIG and TNC. I suppose it wasn't a really novel idea, just one that I hadn't tried yet.

About the time I started working on my suitcase idea, I discovered something that scared the daylights out of me. I needed to see a doctor about a medical condition. OK, it was a small cyst in a funny place that I remembered finding eight months before. Expecting it to go away I simply forgot about it. Mistake. Now, almost nine months later it was still there. And, it was a little bigger.

They say that cancer touches one out of every four people. The more I thought about it the more concerned I became. I put away the ham-suitcase idea for the time being and got a book on cancer. Mistake # 2. What I had was exactly what the book described.

Of course, discovering things like this always happen in the shower on Saturday mornings. This makes you wait the maximum time possible before you can talk with your doctor on Monday. I was so concerned that even being in the shack was no fun. It was just going to have to be a "hang in there and wait it out" weekend before I could call the family doctor and then be referred to a speciaiist.

Monday morning came, and I drove the 45 minutes into work without talking to the gang on 2-meters. I just listened. How stupid I was having not checked the whole thing out months ago. I could give you a lot of details about what happened next, but I'll cut to the chase: I called my doctor. He was away on vacation for two more weeks. While no one was filling in for him, they did give me names of four good people to call. But, those specialists couldn't see me for THREE WEEKS! I was very depressed.

STAY WITH ME . . . you'll like this.

That afternoon at work in Boston I took a ham friend of mine out for lunch. I told Mike about the situation and my attempts to see the doctor. Mike suggested that a very good doctor/ham friend of his, Doctor Smith, was a top specialist in the very field! But, like all people who are good at their trade, he was impossible to see. A pleasant reception person at his doctor's office told me I could get an appointment in about 30 days. SO WHAT WOULD YOU DO AT THIS POINT DEAR HAM READER? I did exactly what you would have done. When accepting the 30 day appointment and giving my name as James Mulvey, I asked the reception person to please tell the doctor I was KS1A.

That evening the phone rang and I heard, "Jim! It's Dr. Smith! What bands are you on?" He wasn't supposed to be at the hospital tomorrow but he'd meet me there at noon for an exam! I checked out just fine and the cyst has since gone away. Dr. Smith not only saw me on his day off because I was a fellow ham, he wouldn't accept payment for the exam (no matter how much I insisted).

It gets better. Dr. Smith took me on a tour of the hospital, including the ham repeater site on the roof. And, as we walked he told me about his MOBIL HAM-SUITCASE! The very thing I wanted to build! It was all such a giant coincidence I'd expect you'd have trouble believing me. But it's true! Ask Mike.

OK . . .here's the smart HAM MOBILE SUITCASE that Dr. Smith built. He has a getaway cottage up in the woods with no electricity. So the MOBILE HAM setup is perfect. He bought the tiny HEATHKIT POCKET TNC. It's so small it fits in a shirt pocket. Then, he scoured the hamfests to find an inexpensive, tiny, flat computer with a terminal program built into it. He found a used radio shack Tandy 102 micro executive computer for about $75. It was just what the doctor ordered, (sorry) with it's built-in battery, modem and communications program! Add his 2-meter HT to the mix, a take apart/fold out antenna, enclose all this gear a briefcase with custom interior foam to keep everything snug, and Voila! You have a terrific portable packet setup to take anywhere! I don't know about you but I think that's cool.

Since then I've met another ham, Steve, who went all out with this idea! Steve has a similar metal briefcase/small suitcase that contains a small HF rig, a KAM TNC, a similar mini-computer that's real small and some fold out antennas. He also manages to keep a small tool kit and portable soldering iron in there! Steve is completely MOBILE on RTTY, AMTOR and PACKET.

On the very last warm day of 1989 we backpacked up Mount Pack Monadnock in New Hampshire, taking along Steve's amazing MOBIL HAM BRIEFCASE. For power he usually uses the car battery or AC in a hotel room. But that day he placed a slew of silver canisters in my pack the size of soup cans, that turned out to be industrial batteries of some kind. I'll admit I know nothing about batteries. But so many hams can rip open some industrial workstation-computer gear they buy at auctions and have complete understanding of the battery canisters they take out. They know what they are, how to hook 'em up, etc.

By late morning Steve and I reached the summit. And for the rest of that beautiful afternoon we hiked around and enjoyed the view, stopping now and then to work DX on AMTOR! Wow!

The easier if not less prestigious way to go DIGITAL mobile is to install the TNC in the car. Another friend of mine, John, K1CGJ has been digital mobile for years. His TNC

and rig are permanently wired into the car. He just adds the laptop computer to do AMTOR and RTTY DX from his car while stuck in traffic! John says that when he gets on Route 3 north here in Massachusetts it's a pipeline into the Soviet Union for his mobile RTTY. Every station he works is surprised and everyone wants a QSL card. I've worked John on RTTY from home while he mountaintops all over the northeast.

All of this is going to be a good deal more common in the days ahead. We hams as a group are a bunch of technoids. We like gadgets! We like to hook up gadgets to gadgets. The laptop computer is getting smaller and smaller. An entire MS-DOS machine the size of a book is on sale everywhere! The TNC is going to keep getting more and more amazing! How many more MODES can the manufacturers keep adding to them? Lots! Packet speeds of 9600 baud are going to become the norm by next year. And, higher speeds are in the future.

So take another look at your TNC and try something new with it! Take it mobile . . . it takes the same 12v as your rig! I just told the local National Traffic System Packet BBS to auto-forward all my mail to my KAM TNC. Now when I call my home computer from work to check for FAXES and messages, I also get a message telling me I have PACKET MAIL WAITING on my hard drive! Experiment. Rethink what you're doing with the gear you have now, and innovate! We consider CW to be a digital mode, you know. If you haven't made some CW contacts in years, try it! It will be a brand new digital challenge.

With the new codeless class of license coming, there will be a much larger base of customers. That means more new types of rigs and TNC's for the ham manufacturers to market.

By the way, with Y2 and DL re-unifying will they become a new DXCC country. And who will be the first of us to work them on a digital mode?

73 de Jim KS1A @ K1UGM.MA

(cont'd from page 17)

WA3PSD wishes to emphasize that there is no evidence of anything wrong with the camera hardware or electronic circuitry aboard WO-18. Except for lack of a good picture of the earth, all thetelemetry and data taken so far indicate everything is fine. Since none of the MICROSATs have an active attitude control system to keep them earth pointing, Chris indicates that more pictures will be taken at differentlatitudes. If you are collecting raw picture data from WO-18, Chris reports that WEBERWARE 1.0 will be released shortly. This software will convert the data files into images. Computer requirements are an IBM compatible PC with an EGA or better monitor.

FLASH!FLASH!***FLASH!***

Late breaking word is that a picture of the earth was successfully taken when WO-18 was over the Himalayas between 0500 and 0600 UTC. Watch the regular news sources for more late breaking details.

by Mike Bryce, WB8VGE
2225 Mayflower NW, Massillon, OH 44646

Amateur Radio Station Logbook / Ver. 5.2

Some times the best things really do come in small packages. I was quite surprised when I booted up this month's logging program; Amateur Radio Station Logbook Version 5.2

Amateur Radio Station Logbook, or I'll just call it the "Logger" for this review, is produced and supported by L. E. "Gene" Brewer, KI6LO.

The program is supplied on either two 5 1/4 inch disks or one 3 1/2 inch disk.

The Logger is designed to run on a MS-DOS computer. This includes the IBM PC/XT/AT and compatibles. Any CPU speed will do. But the faster the CPU, the quicker the program responds. The program is not copy protected.

MS-DOS version 3.0 or higher is needed, although 2.xx may work. I have not tested the program running under 2.xx, but should work. You'll also need 640 KB of RAM.

Since the Logger is a real honest-to-God data base, a hard drive is preferred. You can run the program with floppy disks, provided they're high density drives. A pair of 3 1/2 drives could be used. You'll not be able to run the help files though when using the 3 1/2 drives. With the price of hard drives falling, to within the reach of just about all of us, here is a good reason for getting one.

I tested the Logger on a Tandy 1200 HD running at 4.77 MHz. A ten MEG hard drive was used. Because the Tandy did not have a color monitor attached to it, a mono graphic monitor was used.

You can start the Logger from the DOS prompt to begin either with a mono or color monitor. There are several DOS switches you can use when starting the program. For example. If you want a mono screen, at the command line you enter -M .

To most of us, DOS can be a real pain in the butt. Installing the program was a real treat. All you have to do is this. Be in the root directory of your hard drive. Type "GO." The Logger will then make a directory, copy all files to that directory and prompt you all the way. In the case of 5 1/4 disks, you'll have to remove one disk and replace it with the other. A simple thing even for the beginner computer user.

After the directory is made and the files have been copied, we can begin.

To get the Logger up and running just type LOGV52. If you have a color monitor, Logger will find it. If not, them add a -M to tell Logger you have a mono monitor. There are several other switches you can use when starting the program. These are explained in the manual.

I want to talk about the manual, but will do so later on in this review.

Of course you'll need to configure the Logger to your own personal data.

Aside from your call sign, you'll need the latitude and longitude of your QTH. The difference between UTC time and your local time. For my QTH, there is a five hour difference. This will be used to keep an accurate time/date for real time logging.

You have a choice of seven printer configurations. A good selection is covered. But because of all the many, many different types of printers out there. A print driver for your Gorilla Banana printer may be hard to come by. Epson printers, IBM Proprinter are listed. A generic print driver is also used. You can also have the Logger send a NO INIT to the printer. I used this when my Tandy DMP 132 did wild and crazy things.

To my delight, a date format is possible. Instead of the common date standard we use over here, the DX European date style is possible. As a matter of fact, you have a choice of five different date styles to be used. I chose the American Style for data entry. MM/DD/YY.

I've never been impressed with computer generated QSL cards. Well I was not disappointed with the Logger. It will NOT generate QSL cards. But, will generate sticky labels for your QSL cards. You have a choice of two different sizes of labels. The default is a five line label. You can use a larger label for up to eight lines per label.

You also have choice of a text string when you run labels. So, you can have a European date style such as 10 FEB 89.

One last item, you can have a default operating mode. In my case I run CW most of the time, so that was my default mode.

Of course you can change these settings anytime you wish from within the program.

If you don't name a log file, the program will automatically make a default file for you.

A main menu screen will greet you. From here you'll be able to move about within the Logger. The main screen will also introduce you to the system wide hot keys. Most of these will be though out the Logger. You can turn off the sound prompts, get context sensitive help, get prefix headings, and a host of other goodies. Depending on where you're at within the program, some of these hot keys change functions.

From the main menu, you can see by moving to the QSO data update menu will allow you to do just that. You can use the arrow keys, or just hit the first letter of the menu you want to go to.

The most obvious choice is to ADD a QSO. Here we are greeted with a full screen input page. There are three boxes. The first box is for Station data. The station call, time and frequency as well as mode. The Logger will automatically dupe a station for you. For example. You work W8AU on 40 meters CW. Perhaps two months from now you work him again, this time on SSB on 10 meters. The Logger will find the old contact, and display a 1/4 screen window with the data from the previous contact. You then have a choice of inputting the data from the old contact to the new. The data you'll input is the personal data. Not the QSO data. You will have two entirely different contacts for W8AU, but you won't have to re-type his name, QTH and other personal data. You may turn the auto duping off by pressing ALT-U.

When adding QSOs, you can include up to 160 characters of comments. A window opens up and allow you to add comments to that particular QSO.

Since the Logger will automatically add the date and time to the QSO being entered, real time logging is possible. However if you're like me, I do all my logging after the fact. You can turn off the auto time and date with a ALT-T command. The last time and date will stay until you change it again. This is great for logging in old QSOs from paper log books

I used the default mode of CW for my log. You can call up all modes from a hot key. This allows for a standard in spelling. Otherwise you might spell teletype "RTTY" or "RTY" The Logger will not be able to find both of them when using the query function.

Adding QSOs is quite simple. Just follow the prompt. Most of the fields will automatically jump to the next field.

Since I work a lot of QRP stations, I collect QRP numbers. So one field is set up just for my use, QRP numbers. You can of course change the field to whatever you wish. Country Hunters, Ten-Ten numbers, whatever.

If you have initialized the PREFIX tables, pressing F5 when in the country field will look up the prefix and then import it to the field.

After you're happy with the QSO, you can either edit it or save it. Pressing S and the record is saved to the hard drive.

You have full and complete movement within the Add QSO screen. A help screen is possible by pressing F3.

Being able to retrieve data from a logbook program is what computer logging is all about. The Logger really shines in this area

The log can be indexed by several ways. The most common is by date and time. Once an indexing order is selected, a browsing window is opened. All records from the current log are displayed in a columnar type display. You may use the arrow keys, or page up and page down to scroll through the records. If you prefer, you may press F3 and FIND a record by looking for a match to the CALLSIGN, COUNTRY, STATE or SPECIAL FIELD data.

Of course you may EDIT, DELETE, or CONFIRM a contact. Confirming a record is a DXers delight! By pressing F8 a record is then confirmed. This updates the QSL REC field to a "Y" to signify a confirmation was done.

To print out a QSL sticky label, press F9. You are then prompted to aline the labels or to print the label.

What about printing QSL labels for a batch of QSOs? No trouble!

The Logger has a very powerful query function. In this menu you may build up a query table. For example. You want to find all the CW contacts from March 2, 1988 to May 11, 1989, AND have a 559 or better RST AND the user was running a HW-8. The Logger will find any record that matches the query. As with any sort of this type, the more conditions entered, the systems seems to run slower.

With the query feature you can generate a batch of QSOs to print sticky labels for. Also, you can generate a report for the query table. Of course, you can display to the printer or the screen.

Of course the Logger can generate a REPORT. I used the default report. You can generate your own special report form, but we'll not get into those details here. Enough to say what ever you want in a report, you can have.

An entire section of the manual is devoted to the generation of special report forms.

A report of all PREFIX data is possible. This will produce a printout of country and long and short path based on your QTH. Nice to have laying about in the shack. You may add or delete a new country or prefix to the data at will.

The manual for the Logger comes on disk. Be sure to have a good supply of paper in the printer. Spring for a new ribbon while you're at it too. The manual is 85 pages long. The manual goes into deep detail of the DOS environment. In fact, too much detail for the novice computer user. I would like to see this part of the manual moved to the rear appendix.

The Logger works. No questions about it. A super logging program for everyone. The Logger would fit the needs of the contester, the DX hound, Net Manager, or rag chewer. It's fast, simple to use, and has a quick learning curve. Importing data from paper logs is about a painless as I've seen. The query feature is a must for those working Ten-Ten number, countries, or just want to find out how may 5X5s on 20 meter SSB you've received in the past two years.

A very versatile report generator combined with QSL sticky labels eases the burden of QSLing. I find the option of confirming a QSL without have to edit each entry as an absolute time saver!

Is the Logger the "PERFECT" computer logger? Well it comes very close. There are somethings that I would like to see changed.

The Logger will not communicate with the newer generation of radios. I don't personally find this a problem. If you want to change bands on your radio, you'll have to reach for the knob and do so by hand.

Even though you can search the log for just about everything you could want, I wanted more. You can't look for contacts that you've received a QSL for. You can look for QSL to send, but not received.

The prefix look up could be changed. I found I had to input a lot more key strokes to move to the country field. I would like to see the country field up-dated when ever a new country is added to the log. The way it is now, if you enter a BY4 call, and press the prefix hot key when you're in the country field. You'll find the BY4 is in China. The next call might be a VE1. If you don't up-date the country. The VE1 will be listed in China!

The Logger by Gene Brewer is outstanding. I've only hit on some of the highlights. You really have to sit down and start playing with the program to see what it is capable of doing.

The Logger can be purchased for $29.95. Up-dates are $5.00 This is an outstanding value for the money. You just can't go wrong. I've seen much less for lots more money. If you're serious about a computer based logging program, this is it.

The Amateur Radio Station Logbook is available from LEB Enterprises 1127 North Las Posas, Ridgecrest, CA, 93555

*****Please Note*****

If you have news and information of interest to the digital amateur radio community, please let us know!

COMMODORE HAMS...

A & A Engineering, Inc. offers you a "Choice" means of getting on packet. Now you can choose between the popular software-based DIGICOM>64 system designed by Barry Kutner, W2UP or the NEW DIGICART>64... It's Digicom>64 in a cartridge! NO DISC DRIVE REQUIRED. Either way, you get an effective, and economical approach to joining the packet excitement.

DIGICOM>64 software-based program requires a simple modem interface which plugs directly into the C-64 cassette port or can be remote mounted via cable. A watchdog timer, reed relay PTT and PTT inversion are included. No alignment is required. Operates VHF & HF packet. The Digicom>64 modem, including FREE software is available wired(#154-ASY) $79.95 or in easy to assemble kit(#154-KIT) $49.95 (add $2.50 s/h).

DIGICART>64 features include autobooting and the ability to re-write and save parameters and stored text without a disc drive. Supports all the disc functions available in the regular program. Uses and requires same modem as software version mentioned above. Digicart>64 assembled and tested (#167-ASY) $69.95 or kit version (#167-KIT) for only $49.95 (add $3.50 s/h). VISA/MC ACCEPTED. CA residents add 6.25% s/tax. Order from: A & A Engineering, 2521 W. LaPalma #K, Anaheim, CA 92801. Ph# 714-952-2114.

TECH TALK from ICOM

Computerizing Your ICOM Station

Computer-interfaced transceivers are opening an exciting new dimension in on-the-air operations, and, thanks to ICOM's dedicated customer support, assembling your own computerized station has never been easier or more attractive! After interfacing your ICOM transceiver and home computer, DX'ing and contesting truly move into the "big league" category. You can control various rigs and their functions right from the computer or modify roles so the computer becomes your assistant operator. Using a readily available shareware program for ICOM transceivers, for example, you simply enter a contacted station's call into your computer system rather than writing it in a log. The system, in turn, logs the QSO using the computer's date and time plus your transceiver's frequency and mode. You are even alerted to duplicate or previous QSO's, needed countries for DXCC, desired states for WAS, antenna pointing directions, and much more. Exciting? Yes indeed, and this Tech Talk explains ICOM's tried and proven steps to assembling a smooth operating system.

Two logical questions during station planning are which computers and transceivers are good candidates for interfacing, and exactly what is involved in that procedure. Readily available programs supporting ICOM rigs are written for most IBM-compatible computers, and all ICOM multimode/base station transceivers are easily computer controlled. Interfacing consists of using ICOM's optional CT-17 level converter to mate your transceiver's TTL and the computer's RS-232 voltage levels, loading rig-controlling software into the computer, then ensuring software-selectable parameters agree with transceiver-interface switch settings. Baud rates of each unit must be set equally to exchange data, for example, and specific rig code numbers or "addresses" are necessary so transceivers and computers know "where to send their data." Confusing? Not really. Follow our suggestions and your chances of first time success will be maximized.

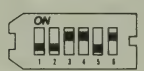
Begin by checking your transceiver's interface circuit and setting its related DIP switches for compatibility with your computer and software. These interfacing circuits are built-into ICOM's IC-765, IC-781, IC-761, IC-575, IC-475A/H, IC-375 and IC-275A/H transceivers. Their switches are factory preset for ICOM's suggested rig addresses and 10200 baud data rates as outlined in your owner's manual and reviewed in Figure 1.

ICOM's IC-735, IC-725 and R-7000 use a logic circuit-integrated interface. They have a fixed rig address, but their computer-interfacing baud rates are jumper or diode selectable. They are factory-set at 1200 bps but changeable to 300 or 9600 bps.

ICOM models IC-751, IC-751A, IC-471A/H, IC-271A/H, IC-1271A and R-71A must be fitted with their optional UX-14 parallel to serial data convertor unit. Before installing the UX-14, set its switches to specify your transceiver's address, band and baud rate as outlined in the UX-14's booklet and reviewed in Figure 1. S1's DIP switches 1 and 2 select baud rates of 300, 1200 and 9600 bps, switch 3 is set "ON" for transceiver operation, and switches 4, 5 and 6 select HF, VHF or UHF band operation. S2's DIP switches 1 through 6 set the radio's address in binary form with OFF equalling "0" and ON equalling "1."

Your computer's RS-232 I/O port and your transceiver's TTL remote control terminal are then connected to ICOM's CT-17 adapter. The CT-17's purpose is to convert your computer's RS-232 level, '+' and '-' 12 volts, to TTL level, +5 volts and 'O' volts. Finally, a transceiver operating program is loaded into your computer and the full setup is checked for proper operation. Initial problems or "bugs" are usually traced to different software and DIP switch-selected parameters. Remember the UX-14 fits several radios, and its S1/S2 switches must be set before installation.

If you experience transceiver or computer interfacing problems or have difficulty locating ICOM-related software, ICOM's customer service hotline at 206/454-7619 stands ready to assist you all the way. Computer-interfaced rigs are the future and, as usual, ICOM continues developing tomorrow's dreams into today's realities!

	ICOM MODEL NUMBER	COMPUTER ADDRESS NUMBER	S2 SWITCH SETTINGS (Binary Count) 	S1 SWITCH SETTINGS  1, 2 depend on your computer's baud rate.	S3 SWITCH SETTINGS  8=TURN ON FOR TRANSCEIVE 9, 10=BAUD RATE
			1 2 3 4 5 6	4 5 6	1 2 3 4 5 6 7
UX-14 REQUIRED	IC-751/751A	28	OFF OFF ON ON ON OFF	OFF OFF OFF	
	IC-471A/H	34	OFF ON OFF OFF OFF ON	ON ON OFF	
	IC-271A/H	32	OFF OFF OFF OFF OFF ON	ON OFF ON	
	IC-1271/A	36	OFF OFF ON OFF OFF ON	ON ON ON	
	R-71	26	OFF ON OFF ON ON OFF	OFF ON ON	
SERIAL INTERFACE BUILT IN	IC-761	30			OFF ON ON ON ON OFF OFF
	IC-575A/H	22			OFF ON ON OFF ON OFF OFF
	IC-475A/H	20			OFF OFF ON OFF ON OFF OFF
	IC-375A	18			OFF ON OFF OFF ON OFF OFF
	IC-275A/H	16			OFF OFF OFF OFF ON OFF OFF
INTERFACE INTEGRATED WITH LOGIC CIRCUITRY	IC-735	4	• Related addresses preset (fixed) at factory.		
	IC-725	40	• All baud rates factory-preset at 1200 BPS.		
	R-7000	8	• Jumpers/diodes used for changing baud rates. (Check Owner's Manual).		
NEW TRANSCEIVERS	IC-781	38	All parameters front panel selectable (See Owner's Manual).		
	IC-765	CALL	ICOM Customer Support for computer addresses and baud rate.		

ICOM America, Inc., 2380 - 116th Ave. N.E., Bellevue, WA 98004 **Customer Service Hotline (206) 454-7619**
3150 Premier Drive, Suite 126, Irving, TX 75063 / 1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
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by Stan Horzepa, WA1LOU
75 Kreger Drive • Wolcott, CT 06716

The Six Shooter

HAVE GUN, WILL CONTEST

The phone installment of the ARRL International DX Contest took place this past weekend and, for the first time in a number of years, I fired up the low band station to spend a few hours working the contest. The reason I did so was to try out a new contest logging program from ZCo Corporation called "The Six Shooter."

The "Six" in the program's name refers to the fact that it is designed for six contests: ARRL 10-Meter Contest, ARRL International DX Contest, CQ World-Wide DX Contest, CQ World-Wide WPX Contest, Field Day, and IARU HF Championship. The software covers both the phone and CW installments of the ARRL DX and CQ contests, so it is actually good for nine contests, but who ever heard of a "Nine Shooter." The "Shooter" in the name refers to the fact that the software can be used by big and little guns alike, as long as they own a Macintosh computer with one Megabyte of RAM and a hard disk. The program is actually a HyperCard stack, so the big or little gun also needs a copy of Apple's HyperCard software, which should not be a problem because, for a number of years, Apple has been shipping HyperCard along with its computers for free.

Loading The Weapon

The Six Shooter is easy to set up and use. After you start the application, you are presented with a HyperCard card that is the focal point of the program. To set-up the program, you click on the card's Utilities button and, when the Utilities card appears, you click on its Station Setup button. In the Station Setup card, you enter your contest station's call sign, the station's state or province, the station licensee's name and address, the names and call signs of all operators (for multi-operator entries), affiliated club name (for club entries), the contest mode (phone or CW), the number of transmitters and the operating category (single op, multi-op, etc).

After entering the information requested in the Station Setup card, you backtrack to the Utilities card and click on the Set Clock button to enter the number of hours difference between the time set in your Mac's internal clock (typically, your local time) and UTC. Being the good MacHam that I am, my Mac's internal clock is already set to UTC, so I entered zero in the Set Clock card.

To complete setting up the program, click on the Erase Current Log button in the Utilities card to delete the contents of the log from a previous contest or a practice session. Backtrack to the main card, select the frequency band you plan to use initially and you are ready to go to work.

Firing The Weapon

When you work a station, type its call sign and report and hit the enter key. If the station is a dupe, the program rings a bell four times and displays a message that you have erred. If the station is not a dupe, the program rings the bell once and the contact is logged with all of the pertinent information that a log needs automatically included (band, date, time, sent and received reports, multiplier, QSO points, etc.) The program defaults to 59 or 599 signal reports sent and received, so the only information you need to enter is the other station's call sign and, in the case of the ARRL International DX Contest, the other station's power. If the signal report is not 59/599, the program allows you to enter a different report.

To dupe a potential contact before working it, you simply type the station's call sign and hit the return key (not the enter key). Four bells indicates a dupe and one bell indicates a good potential contact. A good contact also causes the program to display how many new points the contact represents and if it is a new multiplier.

Faster Than A Speeding Bullet

Using a Macintosh IIci during the contest, I found that the duping and logging functions were fast enough to keep up with my operating pace. The program seemed to respond with a dupe or good contact indication as soon as I finished entering a call sign and report. On a plain vanilla Macintosh SE, the program took longer to complete the same functions. To speed up duping and logging on the SE, I enabled the "Quick Dupe" and the "Disable Scoring" functions. These options shaved approximately one second off the duping and logging times on the SE, however, on the IIci, enabling these options made no measurable difference (refer to the accompanying table).

	Mac SE	Mac IIci
Duping	4 sec	1 sec
Logging	7 sec	2 sec
Duping w/ "Quick Dupe" enabled	3 sec	1 sec
Logging w/ "Disable Scoring" enabled	6 sec	2 sec

According to the program's documentation, when version 2.0 of HyperCard is finally released later this year, it is expected that the duping and logging functions will be quicker.

By the way, when you enable "Quick Dupe," the program stops informing you if a new contact is a new multiplier, nor how many points it is worth, and when you enable "Disable Scoring," the program stops updating the display of your score that is otherwise maintained throughout the contest. (Disabling the "Disable Scoring" function causes the program to resume updating your score.)

Fire-Power

The program is very forgiving. If you erred in logging an entry, you can delete the last logged QSO by clicking the Delete Last Log Entry button or you can edit any loggings by using the Modify Log Entry function that is available in the Utilities card.

The Show Score Sheet button displays a band-by-band and all-band tally of the number of QSOs, multipliers and total points racked up and the Show Log button accesses a window that not only displays the last 14 lines of the contest log, but also allows you to scroll through the whole log and, by simply clicking on a log entry, displays the name of the DXCC country (multiplier) that that entry represents.

A scratch pad is available in the main card to allow you to make notes of anything you desire, for example, the operating frequency of a new multiplier that is now listening for stations in the Second Call Area (and you are in the First Call Area).

To make things real interesting in a phone contest, the program generates digitized

speech in a sex-selectable voice that annunciates key phrases that are used during a typical contest. Click on a button and the program's voice says "CQ," "QRZ," "73," or "QSL," for example.

Cleaning The Weapon

When the contest is concluded, the first thing you do is you click on the Unresolved Calls button in the Utilities card to assist the program in determining the multipliers of the contacts that the program was unable to figure out during the contest. Of the 139 stations I worked, the program came up with three clinkers: PJ0B, YL1WW, and YZ2S. The program's difficulty in handling the PJ0 and YL1 call signs was understandable, however, the YZ problem was inexcusable. According to the official allocation of international call signs, PJ0 could be either the Netherlands Antilles (sans Aruba) or St. Maarten, St. Eustatius and Saba, while YL1 could be almost any one of the numerous Soviet republics, however, the YZ could only be Yugoslavia. Despite the problem handling the YZ, the program did an admirable job figuring out some other tough call signs. You win some and you lose some.

By the way, when a new country is added or deleted to the DXCC country list, the Modify Database button in the Utilities card allows you to change the database to conform with the DXCC's changes. For example, I added new DXCC country Walvis Bay to the database before the contest started. The Modify DataBase function can also be used to add an unknown prefix, such as YZ, to the database.

After assigning the proper multipliers to the unresolved, you backtrack to the Utilities card and click on the Final Paperwork button to generate log, dupe, and summary sheet files (you transfer these files to a word processor for the actual printing). On the Mac IIci, it took approximately four minutes to complete this chore. The program's documentation warns you that with a large log and slower computer, this process can take a substantial amount of time, so it may be wise to perform the Final Paperwork chores during off-times when the computer is not needed for something else more important.

I discovered a minor bug in the Final Paperwork phase of the program. When I loaded the log sheet that the program had generated into my word processor, I discovered that there was no space between the columns listing the QSO points and number of transmitters. Each log entry ended with the number 31 rather than the number 3 followed by a space, then the number 1. This is a minor bug and can easily be fixed using the search and replace function of a word processor, yet it is something to be mindful of before submitting your log to the contest sponsor.

The Six Shooter costs $49.95 plus $3 for shipping and handling for a one-year subscription to six different contest programs. This software subscription assures you that you are always using an updated and improved ("the latest and greatest") version of the program. It is available from ZCo Corporation, PO Box 3720, Nashua, NH 03061.

Made My Day

My overall impression of The Six Shooter is very favorable. The chores involved in operating a contest (duping, logging, and post-contest paperwork) were minimized. All I had to do was work at snaring new contacts and multipliers. I did not have to worry about working dupes, filling in a log, and shuffling through reams of paper when it was all over. I did work one dupe, but that was the result of operator error. I heard the call sign wrong and typed the wrong call sign into the computer.

The only feature I would like to see added to the program is a function that displays multipliers needed and/or worked. Other than that, I believe that The Six Shooter will fill the contesting needs of a MacHam contester, at least for nine week-ends out of the year.

***

Mail to MacHam World may be delivered in any of the following ways:

via USPS: 75 Kreger Drive, Wolcott, CT 06716-2702

via CompuServe: ID no. 70645,247

via packet: WA1LOU@N1DCS.CT.NA.USA

via Internet: 70645,247@compuserve.com

*****Please Note*****

If you have news and information of interest to the digital amateur radio community, please let us know!

by Jonathan L. Mayo, KR3T
3908 Short Hill Drive • Allentown, PA 18104

Landline Telecommunications: Part II

This article is the second of a (now) three part series on telephone based telecommunications. I had originally planned for only two installments; however, I have decided to devote more space to discussing on-line information services in depth. In the first part of this article, I continue with the subject of equipping your microcomputer for landline telecommunicating. The remainder of the article discusses the CompuServe information network and its amateur radio forum, HamNet.

Necessary Equipment

The first article explored the equipment that is necessary for communicating with other computer systems via the telephone lines (also called 'landlines'). To briefly recap, a microcomputer equipped for landline telecommunications is very similar to one equipped for packet radio operation. Instead of a TNC, a modem (MOdulator/DEModulator) is attached to a port on the micro. And instead of a transceiver, the modem interfaces with the telephone line. The modem plugs into the phone jack just like a telephone.

Once the hardware is installed, a terminal emulation software program is run on the microcomputer. There are a wide variety of terminal programs available (as I've discussed in past installments of this column). In the previous installment, I covered acquiring and installing a terminal program. Once that is done, you are ready to telecommunicate. This is where the previous installment left off.

As a brief aside, I have an IBM-PC clone (a CompuAdd 386/20) with an Everex Evercom 24E external 2400 baud modem. And I use ProComm+ as a terminal program. Also, in the previous installment I mentioned MNP. As I explained, it is a 5 level hardware based error checking protocol. I have since learned a little more about MNP that I'd like to pass along to you. MNP stands for Microcom Network Protocol. MNP is generally available in the more expensive modems, so potential modem buyers need to decide if MNP is worth the extra money. Generally, I say that it is worth it.

There are 5 MNP levels or classes. Each increase in level provides a corresponding increase in error checking and correcting ability. A MNP equipped modem operating at Class 5 provides the ultimate protection. In addition, a Class 5 MNP modem will have a throughput roughly double the baud rating. Thus, a Class 5 MNP modem running a 2400 baud is capable of a 4800 bps throughput due to data compaction routines inherent in the Class 5 protocol. However, this data compaction is not available in the lower classes.

Another important caveat regarding MNP modems is that the MNP features will only kick in when connected with another MNP modem. Thus, the MNP features in your modem are not utilized if you are communicating with a non-MNP modem. Also, if you have a Class 5 MNP modem and are communicating with another MNP modem that does not have Class 5 (such as my Everex, which only goes up to Class 3), your MNP modem will have to fall back to the Class 3 level. And not all MNP equipped modems handle the fall back procedure according to the MNP standards. Some will simply turn off the MNP circuitry if the modem at the other end of the phone line is not of an equivalent MNP class.

MNP can be a valuable feature for a modem to have, but keep in mind that you will probably utilize it less that half the time you are online. In general, if you are comparing two similar modems in the same price range and only one has MNP, it is probably worth it to chose the MNP modem - provided that you are not giving up any important features. Fortunately, most MNP modems are replete with extra features anyway.

Enough with the theory; let's get online...

CompuServe

There are two classes of remote computer systems - bulletin boards and information services. Bulletin boards are usually personal computers that are connected to the telephone service via a modem. Other personal computer users who connect to the bulletin board can upload and download programs and other files and leave messages for other users. Information services are large remote computer sites, usually using mainframes and other large computer systems, that can handle thousands of simultaneous users that connect over the telephone lines. Information services have hundreds of thousands of programs and other files available for downloading, feature an extensive electronic mail system, and have large databases available for searching.

Bulletin boards are usually run by individuals or user's groups, and there are thousands of bulletin board systems spread across the nation and the word. The quality of a bulletin board depends almost entirely on the system operator, or SYSOP, that manages it. Many shareware, freeware, and public domain programs are available for downloading from the bulletin board. In addition, users can upload their own programs to the bulletin board for other users to download. Typically, there is no fee for using a bulletin board other that the long distance charges necessary to call it. At most, ten or so users can be connected simultaneously.

Information services are run by corporations. Three of the biggest information services are CompuServe and Genie. There are usually local telephone access numbers near major cities in the United States, so a toll call is usually not necessary to access them. However, information services do charge an access fee for their use. Information services also contain a large number of shareware, freeware, and public domain programs.

CompuServe is the largest online information service in the United States. It also has the largest number of members - over 500,000. Accessing CompuServe (the actual computers are located in Ohio) is done through local access numbers. To locate your local access number, set your modem to 300, 1200, or 2400 baud and your terminal program to 7 bits, 1 stop bit, even parity, and full duplex. Then dial 1-800-FINDCIS (346-3247). At the Host Name prompt, enter Phones and press Return. Then follow the instructions beginning on the next page of this article.

atdt1-800-346-3247 CONNECT 1200

07ACY

Host Name: PHONES

CompuServe PHN-1

Welcome to the CompuServe Phone Number Access area; a free service of the CompuServe Information Service. This area gives you access numbers for the CompuServe Information Service and allows you to report any problems you may be encountering with an access number.

Press <CR> for more !

CompuServe PHN-13

1 Find Access Numbers 2 Report Access Number Problems

Enter choice !1

CompuServe PHN-16

There are surcharges associated with the use of all network access telephone numbers. You will have the opportunity to view access instructions if a supplemental network is selected.

*** Important Note*** This program gives you the best two numbers, based on the number you are dialing from. While this is usually the least costly method of accessing, this will not hold true in all cases. You should check with your local phone service company if you are unsure.

For additional access numbers, type GO PHONES at any CompuServe Information Service prompt. So that we may support others, you will be logged off after receiving your two access numbers.

Press <CR> for more !

CompuServe 800PHN

Baud Rate

1 300 - 1200 Baud

2 2400 Baud

Enter choice !1

CompuServe 800PHN

Enter your full phone number (example: 614 457-8600) :814-XXX-XXXX

From STATECOLLG PA

Call (814) 238-7910 STATECOLLG [COMPUSERVE]

Or

Call (814) 234-3853 STATECOLLG [TYMNET]

Would you like to see gateway instructions (Y/N)?y

CompuServe PHN-5

The TYMNET logon procedure is outlined below:

"Please type in your terminal identifier"

Enter: A

"Please log in"

Enter: CPS

Once all the responses are entered correctly you will receive "User ID:" and then a "Password:" prompt.

Note: If you make a mistake in your entry at the "Please log In" just press the Enter or Return key. TYMNET will prompt you for "User Name". Enter CPS at this prompt.

If you enter a backspace at the "Please log in" or "User Name" prompts, your duplex setting in your communications parameters will set to half-duplex. In half-duplex, entries from your keyboard will not appear on your screen, although CompuServe will receive them. Once in half-duplex, you will need to log off and log on again. This will return you to the correct full-duplex setting for communicating with CompuServe.

Off at 11:55 EST 5-Mar-90

Following this procedure, you should now have your local access number. However, this will not do you much good until you join CompuServe. In many cases, your modem or terminal program will have come with a CompuServe membership for free. If not, you will have to contact CompuServe at 1-800-848-8199 to order a CompuServe Membership Kit, costing about $40. The time you spend on CompuServe isn't free. You are charged about $6 an hour at 300 and 1200 baud and $12 an hour at 2400 baud. While this may seem expensive, it's not too bad compared with what other online information services charge or what a long distance call to a remote bulletin board would cost for the same amount of time.

Once you are a member and have a User ID number and password, dial your CompuServe local access number and log on. Once you have logged on, type GO HAMNET at any prompt ending with a '!'. You will then enter the CompuServe Amateur Radio and SWL Forum. If you have not visited HamNet before, you will be presented with a short spiel encouraging you to join the forum. Using the forum does not add any cost to your standard online fee. At this point, join the forum by selecting the appropriate menu item.

Once you are in the forum, you can leave messages to other members, upload and download files, or communicate in conference mode online. Below is the main HamNet menu:

HamNet <Ham Radio> Forum Menu

1 INSTRUCTION

2 MESSAGES

3 LIBRARIES (Files)

4 CONFERENCING (0 participating)

5 ANNOUNCEMENTS from sysop

6 MEMBER directory

7 OPTIONS for this forum Enter choice !

There are a wide variety of subject headings on HamNet. The Message and Library areas are divided into these subject headings so it is easy to locate information on the subject you are interested in. Below is a list of the HamNet subject headings:

0 HamNet Roundtable

1 HamNet NewsLine

2 VHF/UHF Scanning

(cont'd on page 28)

(cont'd from page 27)

3 ShortWave Listening

4 FCC & Regulatory

5 Amateur Satellites

6 Operating

7 Entry Level License

8 DX'ers

9 Packet Radio

10 Homebrewing

11 Antennas

12 Swap Shop

13 AEA Support

14 ICOM Support

Here is a list of some of the messages available from the Packet Radio heading (number 9):

Subject (# msgs)

Section 9 - Packet Radio

1 Packet Radio Forum 90 (1)

2 TAPR TNC & KISS (4)

3 HT use on VHF Packet (6)

4 Help (1)

5 HT use on VHF Packet (4)

6 TCP/IP NOS question (3)

7 TAPR election (1)

8 KAM VS PK232 (1)

9 TCP/IP User Access Prgm? (8)

10 BBS Question (3)

11 UNIX Packet software (6)

12 DCD mod and DRSI PC*PA (1)

13 TAPR FAX Online (1)

14 AA4RE BBS Ver. 2.8 (1)

15 Bad 1.1.7 Chip (2)

16 PACKET/COCO (1)

Enter choice(s) or <CR> for more !

HamNet is a great place to keep up to date on amateur radio activities. You can find out the latest news, meet other hams with similar interests, get programs and newsletters, and a multitude of other files and messages. I encourage you to make HamNet a regular stop on your visits to CompuServe.

Conclusion

HamNet is but one of many forums available on CompuServe. To locate other forums of interest, use the online index (GO INDEX). With index, you supply a keyword and the database will list the corresponding forums. CompuServe also includes an excellent electronic mail (E-mail) system. With CompuServe mail, you can send messages to other members, have messages FAXed, or printed and mailed via the postal system. In fact, I use CompuServe to transmit my columns to Tom Arvo at Digital Digest. I upload the text and 'mail' it to Digital Digest's account. Tom can then retrieve it at his convenience. By the way, my CompuServe ID is 72276,2276 and Digital Digest's is 73330,1335. Feel free to let us know what you think about the column.

In the next installment, I will continue with exploring another source of online information regarding amateur radio.

The Kantronics DVR2-2...

Good day all. I just thought that I would take the time to tell you about a radio I have been using for the last few months. It is a neat little radio and has several of the features that a lot of people have called for. It's the Kantronics DVR2-2 packet specific radio.

This little jewel is perfect for my packet operation and would also make a good mountaintop digi radio. The radio has 2 watts out and has two channels available for use. My understanding is that Kantronics is going to be making a ten channel board option later. What makes it a good little rig is that if I had another DVR2-2 around to test it, this thing has a keyup time from push-to-talk activation to full power of 5 milliseconds. Most radios have a 100-300 millisecond keyup time. It also has a 10 millisecond carrier detect output. Combine these two features and you have a TXD setting of 2 (20 milliseconds) - most hams today are using 15 - 20. In fact, I have to set my TXD to 15 just to get anyone to hear me.

I can't use it, but the DVR2-2 also has a discriminator output on the rear panel connector. [Also a direct connection to the modulator - Ed.] It is designed to connect directly to a high speed modem, if needed, up to 9600 baud. Nice idea (gee I wonder if the XYL will let me go 9600?) If you own a Kantronics TNC, (I have the KAM) it is designed for a pin to pin compatibility with the DB9 connector on the TNC (the radio's TNC connector is also a DB9). Kantronics has also added a microphone input if you want to put your rpt pair into one of the channels.

Most of the people I have spoken to have wondered why only 2 channels. But only 6 months or so ago, many hams I talked to were in search for just such a rig for packet and mountaintop use. Oh well, guess you can't please everybody.

The Kantronics rig came with 145.01 and I'm now installing 145.03. This is truly a great little rig and deserves your consideration for dedicated, portable packet-only operation. For more information, ask for Karl at Kantronics and tell him Scotty sent ya'.

by Scotty, KF7QZ / Reprinted from Zero Retries Newsletter

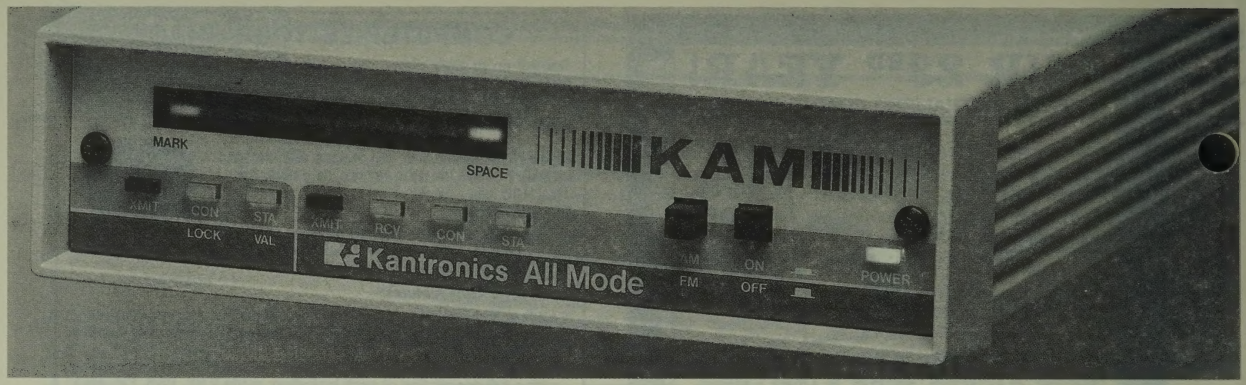
National Computer Net...

IBM and Motorola have announced the creation of a nationwide radio network that will allow hand-held and lap-top computers to connect into host systems from anywhere, without going through the telephone system. The companies say that the new system is designed to give those who are considered to be "mobile or ambulatory workers" access to more instant data than ever before.

Potential users of this service include field service personnel like maintenance technicians, real estate brokers, package delivery drivers, insurance agents and law enforcement, to name only a few of the estimated million-plus potential subscribers. By using a hand-held wireless terminal connected to the radio network, a copier repairman, for example, could be told by his dispatcher what service calls have to be made, and where and what the problems with the copy machines are. He, in turn, could check on replacement parts availability from the warehouse, even if that facility is on the other side of the country, arrange shipment and schedule parts installation before leaving the customer.

The new service, which will start in April, would appear to be in competition with cellular telephones. By using a hand-held cellular phone, lap-top computer and modem tied to a mainframe computer, a similar service can be installed by almost anyone. However, Motorola and IBM claim that their new system is far more useful because it is "on-time" at all times. Exact pricing of the service has not yet been announced, but it is expected to run between $100 and $150 per month per terminal. Also unknown is where in the congested radio spectrum will the IBM/Motorola joint venture find the required space on either a dedicated or non-interfering basis with other users.

Source: WestLink Report - 02/16/90



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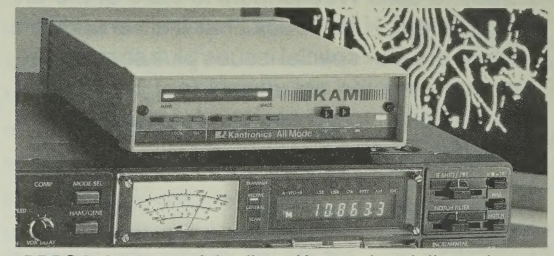

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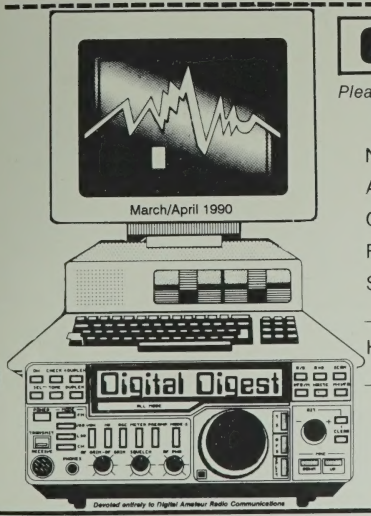

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